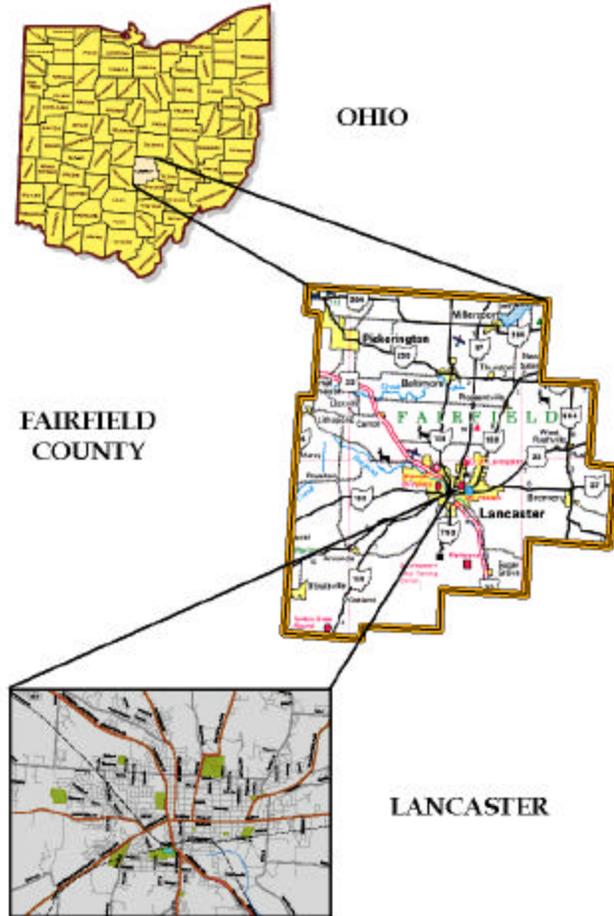


Thoroughfare Plan 2003 Revision



Prepared For:

City of Lancaster



Prepared by:

WILBUR SMITH ASSOCIATES

January 30, 2004

Thoroughfare Plan 2003 Revision

City of Lancaster, Ohio

Prepared for:



Prepared by:



6660 Doubletree Avenue Suite 18
COLUMBUS, OH 43229
Phone: (614) 888-9440
Fax: (614) 888-6021

STEERING COMMITTEE MEMBERS

Member Name	Affiliation
Frank Anderson	Fairfield County Engineering
Denise L. Crews	City Engineering Department
Brooks Davis	Fairfield County Regional Planning
Tim Dannemiller	ODOT District 5
John Hilliard	City Division of Electricity & Communications
Kent Huston	City Engineering Department
Gary Lockwood	Lockwood Lanier Mathias & Noland
Rick Mark	City Engineering Department
Don McDaniel	Lancaster Police Department
Mitch Nusser	City Division of Streets

Public Involvement

The public involvement process includes interaction with steering committee members, public groups, business owners and media. The following meetings were conducted as part of the study:

Steering Committee Meetings

The following Steering Committee meetings were held as part of this project:

- Meeting 1 on October 4, 2002 - To introduce the Wilbur Smith Associates team and to give a brief overview on the scope of the study.
- Meeting 2 on December 6, 2002 – To discuss the responses from the first public meeting; to discuss existing conditions analyses and future ‘do nothing’ conditions.
- Meeting 3 on February 20, 2003 – To discuss the proposed improvements.
- Meeting 4 on March 21, 2003 – To discuss the roadway functional classification system.
- Meeting 5 on July 25, 2003 – To discuss the responses from the second public meeting and to gather final comments on the draft report.

Public Meetings

The following Public meetings were held as part of this project:

- Meeting 1 on November 7, 2002 – To introduce the study to the public and to gather their perception of problems.
- Meeting 2 on June 16, 2003 – To present the findings and recommendations of the study and to gather their comments before finalizing the report.

The public meetings were widely advertised using posters, press release, radio interview and website announcements. The questionnaires distributed at the above public meetings are included in Appendix A

Table of Contents

Chapter 1: Introduction	1
1.1 Study Purpose	1
1.2 Study Area.....	1
1.3 Background	2
1.4 Scope of Services.....	3
Chapter 2: Existing Conditions and Trends	5
2.1 Transportation Network	5
2.1.1 Roadway Capacities	5
2.1.2 Signal Densities	5
2.1.3 Daily Traffic Volumes	9
2.1.4 Level of Service	9
2.1.5 Truck Volumes.....	12
2.1.6 Traffic Operational Issues and Concerns	12
2.1.7 Planned Roadway Improvements	14
2.2 Socioeconomic Conditions	14
Chapter 3: Future Conditions – “Do Nothing”	17
3.1 Impact on Transportation Network	17
3.1.1 Daily Traffic Volumes	18
3.1.1.1 <i>Traffic Growth on City Streets</i>	19
3.1.1.2 <i>Traffic Growth on State Routes</i>	20
3.1.1.3 <i>Travel Pattern with US 33 Bypass</i>	21
3.1.2 Traffic Operational Issues and Concerns	22
3.2 Impact on Socioeconomic Conditions	25
3.2.1 Land Use Issues	25
3.2.2 Economic Development	27
Chapter 4: List of Improvements	28
4.1 Introduction.....	28
4.2 Proposed Improvements.....	28
4.2.1 Ring Road	29
4.2.2 New Connectors	32
4.2.3 Roadways Widening	34
4.2.4 Operational Changes.....	36
4.2.4.1 <i>One-way Street Operations</i>	36
4.2.4.2 <i>On-street Parking Restrictions</i>	38

4.2.4.3 Unwarranted Signal Removal & Multiway STOP Sign Removal	39
4.2.5 Driveway Access Management	40
4.3 Cost Estimates and Project Rankings	41
Chapter 5: Roadway Functional Classification System	43
5.1 Introduction	43
5.1.1 Principal Arterials	44
5.1.2 Minor Arterials	45
5.1.3 Collectors	45
5.1.4 Local Streets	45
5.2 Existing Functional Classification System	45
5.3 Proposed Functional Classification System	47
5.4 Roadway Design Standards	48
5.4.1 Cross Section Standards for Major Arterials	48
5.4.2 Cross Section Standards for Minor Arterials	50
5.4.3 Cross Section Standards for Collectors	51
5.4.4 Cross Section Standards for Local Streets	52

List of Figures

Figure 1-1: Location of the Study Area	1
Figure 1-2: Study Area Details	2
Figure 1-3: Official 1973 Thoroughfare Map	4
Figure 2-1: Roadway Capacity - Available Lanes (includes Parking Lanes)	6
Figure 2-2: Roadway Capacity - Travel Lanes	7
Figure 2-3: Signal Density along Study Corridors	8
Figure 2-4: Traffic Volumes along Study Corridors	10
Figure 2-5: Level of Service along Study Corridors	11
Figure 2-6: Truck Volumes along Study Corridors	13
Figure 3-1: Areas of Distinct Traffic Growth	20
Figure 3-2: Estimated Traffic Volumes in Year 2025	23
Figure 3-3: Year 2025 Level of Service along Study Corridors	24
Figure 4-1: Ring road concept for Lancaster as part of ODOT's "Access Ohio – Micro Phase" report	29
Figure 4-2: Interim Ring Road for the City of Lancaster	31
Figure 4-3: Proposed New Connectors	33
Figure 4-4: Proposed Roadway Widening	35
Figure 4-5: Proposed Operational Changes	37
Figure 4-6: Comparison of Two-Way vs. One-Way Operations	38
Figure 5-1: Functional Classification System Hierarchy	43

Figure 5-2: Typical Roadway Functional Classification System.	44
Figure 5-3: Existing ODOT’s Roadway Functional Classification for the City of Lancaster.	46
Figure 5-4: Proposed Roadway Functional Classification.	489
Figure 5-5: Typical Roadway Sections for Major Arterials.	50
Figure 5-6: Typical Roadway Sections for Major Arterials (100’ ROW).	50
Figure 5-7: Typical Roadway Section for Minor Arterials.	51
Figure 5-8: Typical Roadway Sections for Collectors – Alternative 1.	51
Figure 5-9: Typical Roadway Sections for Collectors – Alternative 2.	51
Figure 5-10: Typical Roadway Sections for Collectors – Alternative 3.	52
Figure 5-11: Typical Roadway Section for Local Streets.	52
Figure 5-12: Typical Roadway Section for Local (Multi-Family) Streets.	53

List of Tables

Table 3-1: Unacceptable LOS Conditions.	22
Table 3-2: Population Trends.	25
Table 3-3: Fairfield County Population Projections.	26
Table 4-1: Cost Estimate and Project Rankings for Proposed Improvements.	42

Appendix A – Level of Service (LOS) Description

Appendix B – Public Survey

Appendix C – ODOT Draft Report

Appendix D – Proposed Improvements & Proposed Functional Classification

Chapter 1: Introduction

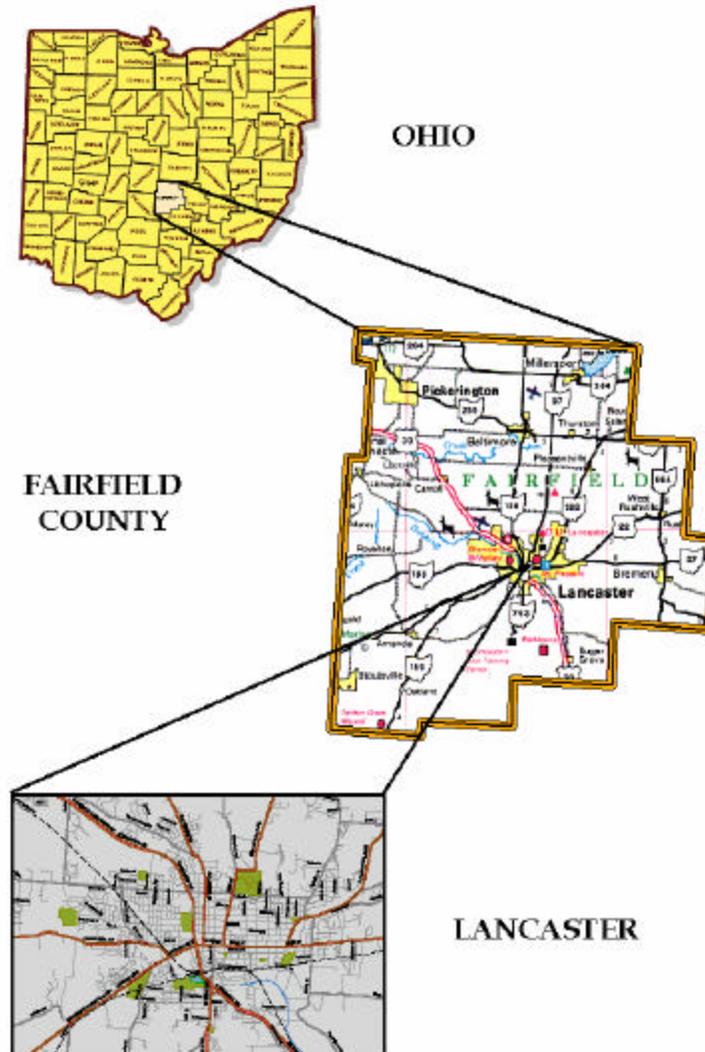
1.1 Study Purpose

The purpose of the study is to evaluate the existing and future transportation conditions in the City of Lancaster and update the thoroughfare plan that was adopted in 1973.

1.2 Study Area

This thoroughfare plan update is applicable to the entire area within the corporation limits of the City of Lancaster, Ohio. Figure 1-1 shows the location of the study area. As shown in the figure, Lancaster is located in Fairfield County, Ohio. Details of the study area are shown in Figure 1-2.

Figure 1-1: Location of the Study Area.



Given Lancaster's proximity to an ever expanding Columbus, its status as a trade center within the region, mix of important state routes crisscrossing the city, and the need to accommodate future growth, it is important to plan ahead and provide a street system with enough capacity for the city. This can be achieved through implementation of a current city wide Thoroughfare Plan.

The City of Lancaster has grown significantly since the adoption of the last thoroughfare plan. Figure 1-3 shows the 1973 Thoroughfare Plan. Two important connections are shown on the map - the U. S. Route (US) 22 and US 33 bypasses. US 33 bypass is finally becoming a reality and is expected to be completed in 2005. However, the location of the bypass currently being constructed is different from that shown in the 1973 Thoroughfare Plan. The US 22 bypass has been studied several times since 1973 but is has not yet had an alignment selected. The construction of the US 33 bypass will change both travel patterns and development patterns within and around the city.

In addition to the above issues, the existing thoroughfare plan does not meet Ohio Department of Transportation's (ODOT) Federal Aid requirement of a roadway functional classification system. In order to secure federal funds for roadway improvements, it is important for the city to have roadway functional classification system based on ODOT's Federal Aid system.

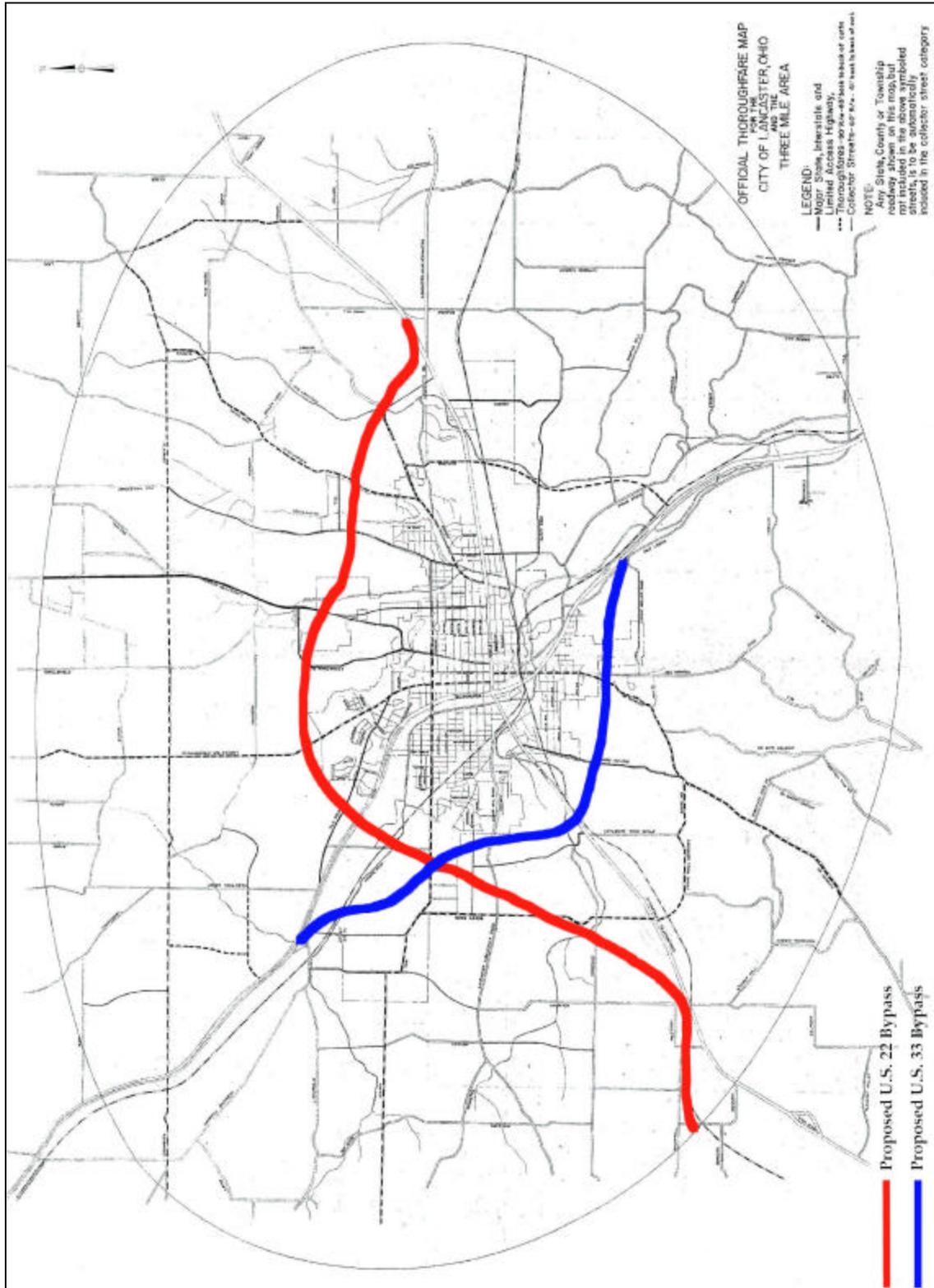
Growth in the city and a shift in travel patterns, coupled with the ODOT requirements for federal funds, have created a need for the city to develop a new thoroughfare plan. The new thoroughfare plan will revise the current functional classification system and also include typical sections for each classification. This will allow the city to secure the needed right-of-way as developments occur along any roadway.

1.4 Scope of Services

The Thoroughfare Plan that will be developed as part of this document will include the following tasks:

- Analyze existing and future traffic conditions.
- Identify the needed roadway improvements.
- Develop roadway functional classification map.
- Develop typical cross-sections for each functional classification.
- Prioritize roadway improvements.
- Work with the Steering Committee to develop recommendations.
- Inform the public of the process and recommendations through Public Meetings as needed.

Figure 1-3: Official 1973 Thoroughfare Map.



Chapter 2: Existing Conditions and Trends

2.1 Transportation Network

2.1.1 Roadway Capacities

The roadway capacities are looked at from two different points of view – available lanes and travel lanes. The number of available lanes takes in to consideration the width of the pavement including parking lanes. The travel lanes exclude the roadway that is currently designated for on-street parking. The roadway capacities include both directions of travel and range from 2 to 6 lanes. In computing the levels of service (LOS) for the study network, only the travel lanes are considered.

Figure 2-1 shows the number of lanes that could be achieved with the existing roadway widths in the study area. A portion of US 22/SR 37 (Main Street east of Maple Street) is the only section that has 6 available lanes. Parts of US 33 (Memorial Drive) and US 22/SR 37 (Main Street) have 5 available lanes. The rest of the streets have 4, 3 or 2 lanes available.

Figure 2-2 shows the number of travel lanes in the study area. Most of the streets have two travel lanes with a few portions that have a third center two-way left-turn lane. Corridors having four travel lanes are US 22/SR 37 (Main Street) east of Maple Street, Fair Avenue west of the railway tracks to Barr Drive and US 33 north of Pierce Avenue and south of Main Street. US 33 (Memorial Drive) between US 22 and Pierce Avenue and US 22 on both sides of its intersection with US 33 both have 5 travel lanes.

2.1.2 Signal Densities

Signal density is an important criterion in determining LOS. Higher signal densities result in lower levels of service and higher perceived levels of congestion. Along each study segment the number of traffic signals are counted and converted to a signal per mile density value. The densities are expressed as Minimum (0 to 1 signal per mile), Low (2 to 4 signals per mile), Medium (5 to 7 signals per mile), or High (8 to 10 signals per mile).

Figure 2-3 is a map of the signal densities in the study area. Signal densities are higher near the center of the city and densities reduce moving towards the city boundary.

Figure 2-1: Roadway Capacity - Available Lanes (includes Parking Lanes).

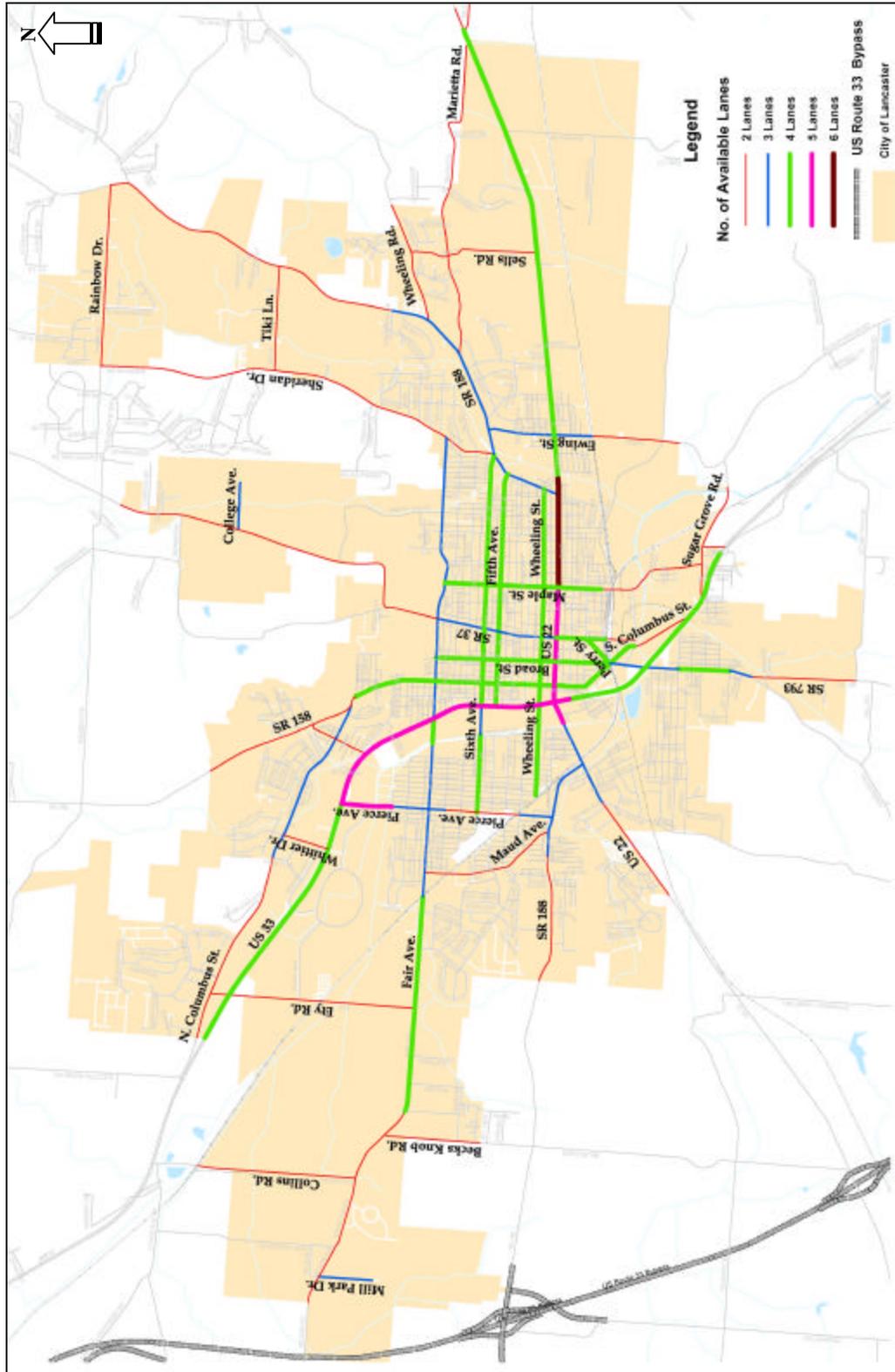
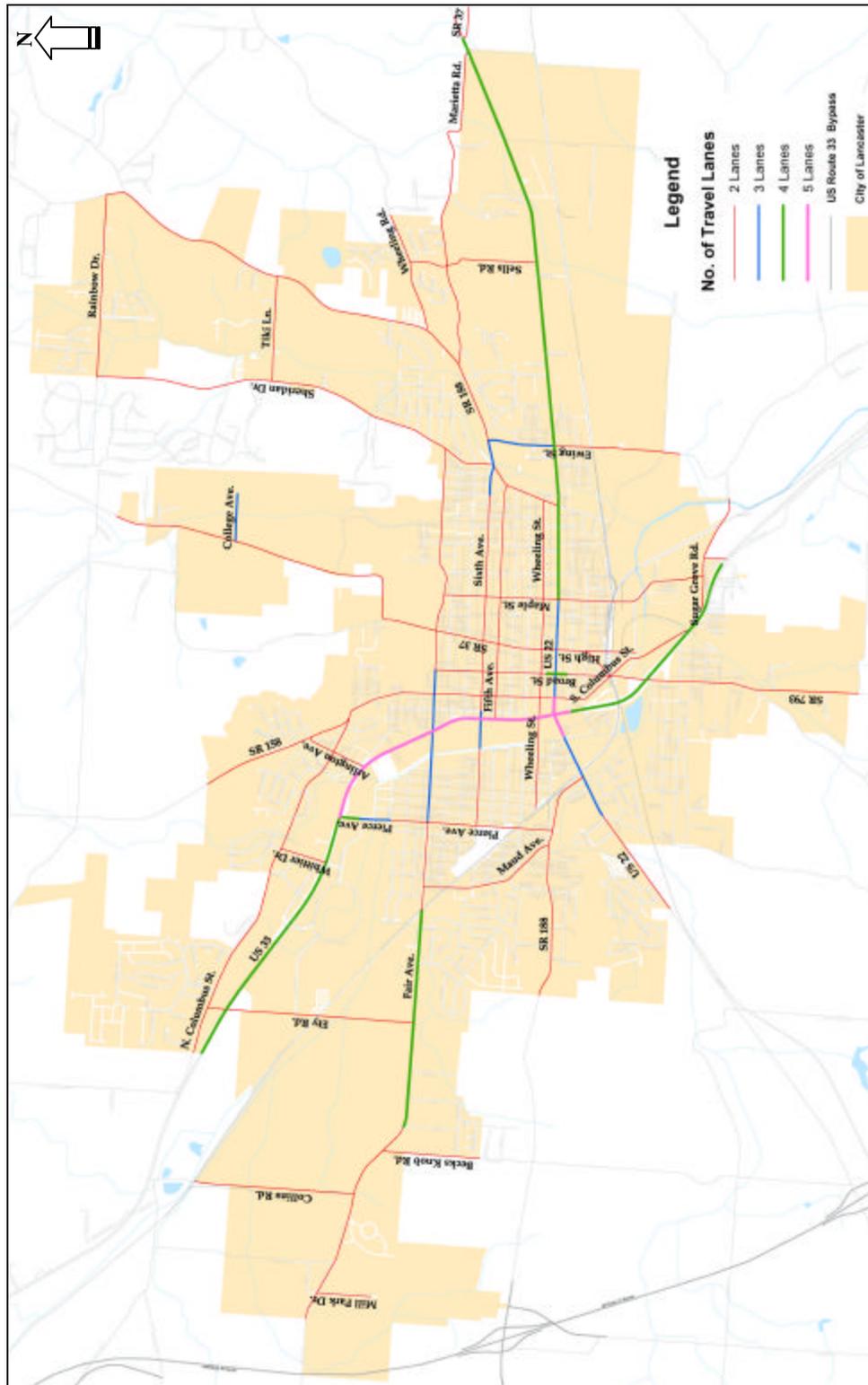


Figure 2-2: Roadway Capacity - Travel Lanes.



2.1.3 Daily Traffic Volumes

The total number of vehicles traveling along a roadway (both directions of travel) during a 24-hour period constitutes the daily traffic volume or vehicles per day (vpd) along the particular roadway. Using intersection traffic volume counts data collected and maintained by the City Electrical Department, daily traffic volumes are computed for the study segments.

Figure 2.4 shows the existing daily traffic volumes in the study area broken down into 10,000 vehicles per day increments. US 33 (Memorial Drive) experiences the highest traffic volumes in the study area. US 33 (Memorial Drive) north of US 22 (Main Street) sees more than 30,000 vpd and portions of it (between Sixth Avenue and Pierce Avenue) carry in excess of 40,000 vpd. Other streets carrying significant traffic include US 22, portions of State Route (SR) 188, Sixth Avenue, SR 37 (High Street) north of Sixth Avenue and Fair Avenue. While the state routes within the study area experience traffic volumes in excess of 20,000 vpd, the remaining routes experience less than 20,000 vpd. Major roads, excluding state and federal routes, outside the city limits (but within Fairfield County) were also looked at and they experience less than 7,000 vpd.

2.1.4 Level of Service

Level of Service (LOS) measures the restrictive relationship between factors such as traffic volume, signal density and roadway capacity, to provide an index to the quality of traffic flow in terms of travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. LOS in this study is based on daily traffic volumes (24-hour counts) as described above and is meant for planning level analyses. Six LOS conditions are defined for each type of facility (roadway segment, intersections, etc.) and are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions as described in Appendix A. Under existing conditions, for most roadway segments, an LOS of D or worse is considered unacceptable. For roadway segments within the designated Central Business District (CBD or downtown area), LOS E or F is considered unacceptable. For future planning purposes, LOS D or better is typically considered acceptable outside CBD and LOS E or better in CBD.

Figure 2-5 includes the computed LOS for the study segments. Combining higher signal densities and higher traffic volumes, streets near the central core of the city experience worse LOS conditions when compared to outlying streets within city limits. These are planning LOS based on analyses of daily traffic volumes, signal densities and number of travel lanes.

Major roads outside the city limits (rural/county highways) operate under planning LOS conditions at acceptable levels (C or better).

Figure 2-4: Traffic Volumes along Study Corridors.

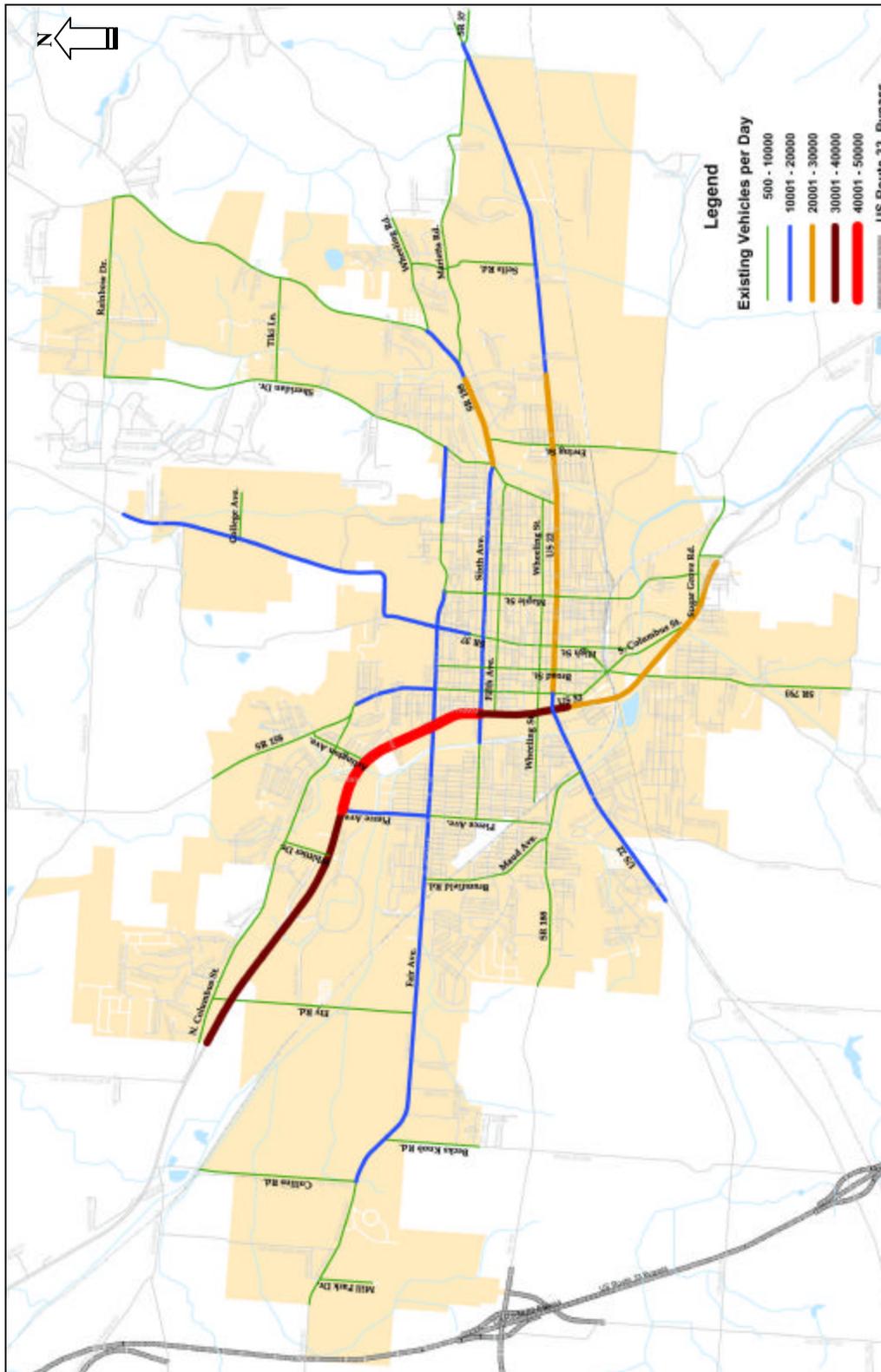
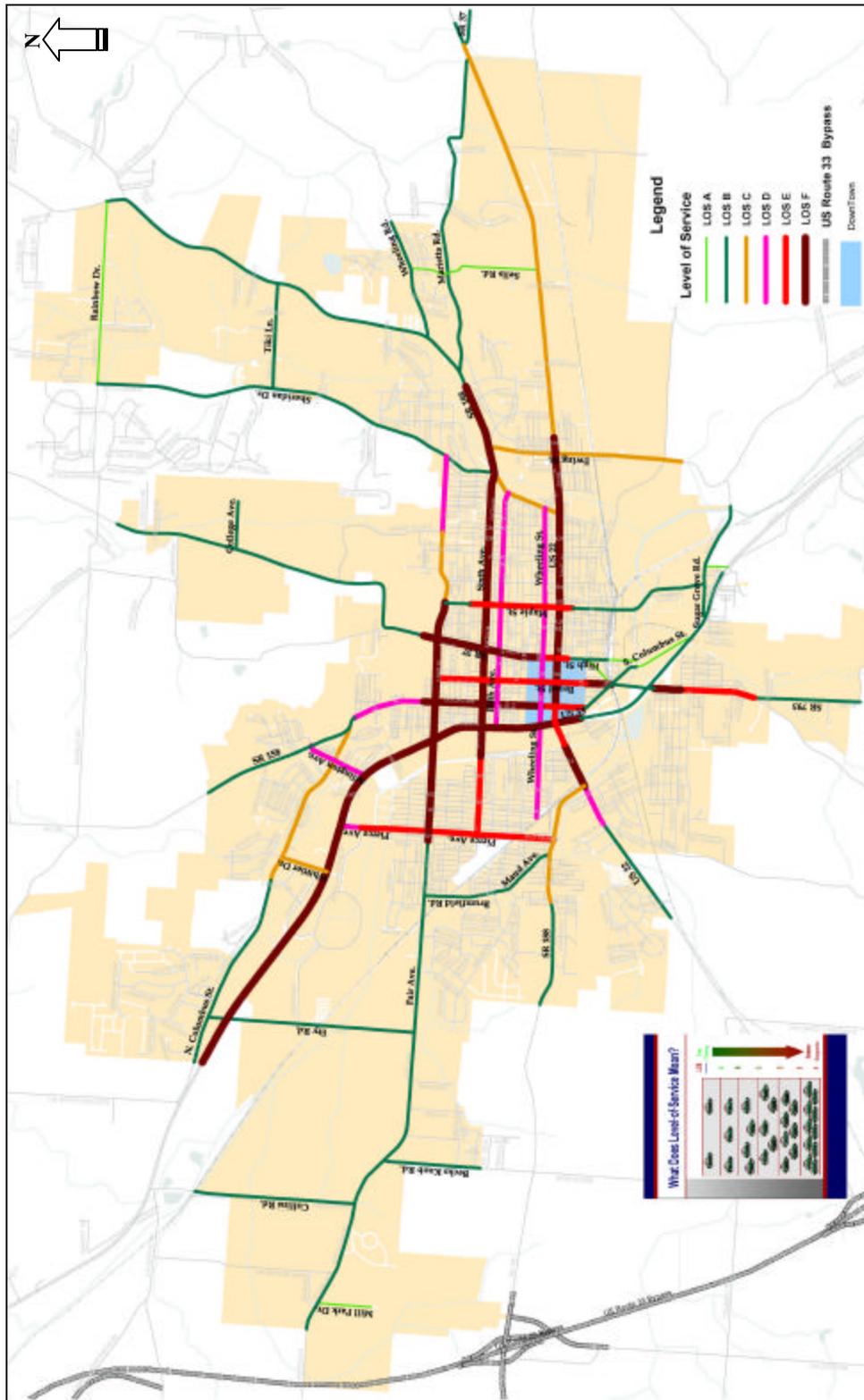


Figure 2-5: Level of Service along Study Corridors.



2.1.5 Truck Volumes

Truck volumes in a transportation network are important for many reasons. They affect the overall quality of travel and also affect the planning and design of roadways (e.g. lane and road widths; turning radii; minimum overhead clearances; longer yellow and red clearance times at signalized intersections, etc.). Per day truck volumes along different routes were obtained from year 2000 ODOT counts (for state highways) and through 24-hour tube-counts at key local street locations.

Truck volumes are presented in Figure 2-6. The highest truck volumes are along US 33 and US 22/SR 37 (Main Street). Sixth Avenue and Sugar Grove Road carries the highest truck traffic with more than 2,000 trucks per day.

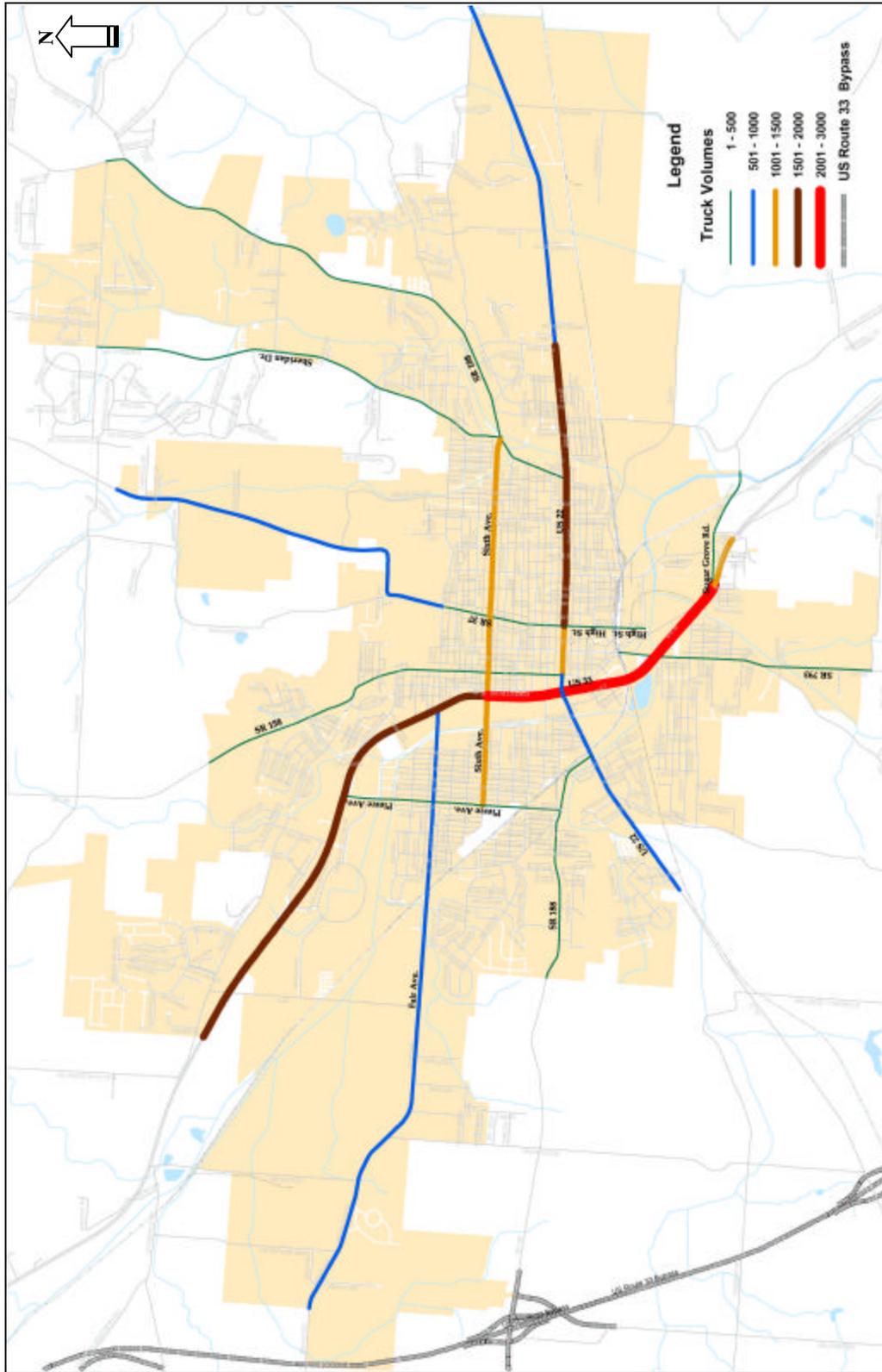
2.1.6 Traffic Operational Issues and Concerns

A public survey questionnaire was designed to gather input from the citizens of the City of Lancaster. A copy of the survey questionnaire is included in Appendix B. The survey was designed to look at the citizens' perspective in terms of potential corridor improvements to be considered in the Thoroughfare Plan Update. The questionnaire included both subjective responses where respondents described their concerns, as well as objective responses where respondents selected answer(s) from a list of responses to a question in the survey.

The Thoroughfare Plan Update questions ranged from identification of traffic issues to observed significant changes during their period of residency in Lancaster to views on the proposed US 33 Bypass. The survey elicited the following responses from 11 respondents:

- Major issues in the City of Lancaster (in order of number of responses): Traffic congestion, narrow lanes, high growth rates; bicycle and pedestrian traffic. Some responders also felt that narrow or no shoulders or sidewalks were also areas of concern.
- River Valley highlands and US 33 (Memorial Drive) in the northern part of the city were identified as the areas of most significant growth. The general perception among respondents was that this growth resulted in increased congestion along US 33 causing many drivers to divert to North Columbus Street and congesting this street as well.
- Almost all respondents felt that the most significant change in traffic pattern during their time of residency in the City of Lancaster was the increased peak hour (morning, mid-day and evening) congestion on US 33 (Memorial Drive) and the resultant spill over of traffic onto the parallel North Columbus Street.

Figure 2-6: Truck Volumes along Study Corridors.



- Major concerns with the existing study area streets were (in order of importance as identified by number of responses) Sixth Avenue, Fair Avenue, US 33, US 22 and SR 37. Streets mentioned by one or two respondents each also included Broad Street, North Columbus Street and SR 188. In general the major concern along all these streets was traffic congestion.
- A vast majority of the respondents felt the construction of US 33 Bypass would be a benefit even if it were only in the form of temporary relief in peak hour congestion along existing US 33 (Memorial Drive). Most respondents felt that a truck traffic reduction on US 33 (Memorial Drive) would be the greatest benefit of the US 33 Bypass causing improved intercity traffic movement.
- Most respondents said they would rarely use the US 33 Bypass or use it a few days a week at most. On the occasions when they would use it, most respondents said they would use the proposed interchanges at Old US 33 on the south side or at Coonpath Road north of City of Lancaster limits.
- All but one respondent felt there is a need for a US 22 Bypass to help rid the downtown area of the through truck traffic.

2.1.7 Planned Roadway Improvements

Roadway improvements that are currently planned include extension of Mill Park Drive which is located within the Rockmill Industrial Park on the western side of the city. This capacity expansion is planned all the way south to SR 158 (Lancaster-Circleville Road).

2.2 Socioeconomic Conditions

1. The City of Lancaster utilizes water and sewer extension policies that typically require annexation prior to extension to areas currently beyond the city corporate limits. These policies can be very effective in managing growth and development. Generally, residential land use densities will be lower unless water and sewer service is available.
2. New growth in the vicinity of the City of Lancaster is anticipated to primarily occur north and west/northwest of the existing city limits. The city's water system planning and sewer system planning is also focusing on this area. Information contained on the city's water planning documents, which accompany the "Alternative 1A Water Needs Map", projects future development by type (e.g. single-family, multifamily, commercial, and industrial) by acres anticipated to be served. Data is presented for the year 2025 and 2045. This information will be useful to project traffic generation.
3. Recent population growth trends within Fairfield County indicate that the county as a whole has grown at a pace of approximately 18 percent since 1990 for a total 2000 population of 122, 759. The City of Lancaster's population grew approximately two (2) percent between 1990 and 2000 for a total 2000 population

of 35, 335. The City's 2000 population comprises approximately 29 percent of the total Fairfield County population.

4. The County's land use plan projects growth outside the city limits within the same vicinity, north and west of the city limits, with commercial, industrial and other uses along the new bypass route. Additionally, growth is anticipated in the county along the U.S. Route 33 corridor between the City of Canal Winchester and the City of Lancaster.

Land has been purchased at the intersection of U.S Route 33 and Coonpath Road by the Mount Carmel Health System for the development of a new hospital and ancillary uses. This development will likely have significant impact on traffic flow in the county.

5. Discussions with city staff and others indicate there will be future land uses on the eastern side of the city and a need for access to the west toward the major highway system. Efforts should consider alternate access from the east to the west. Lake Road/Coonpath Road improvements seem to be a reasonable alternative for consideration until a bypass is constructed.

There is significant vacant land and very viable commercial development east/northeast of the city. Furthermore, there is also another medical complex, the Fairfield Medical Complex, near the intersection of SR 188 and Ewing Street. This complex attracts significant traffic to an area that is predominately residential. Several significant industrial land uses also exist east of the city along US 22/SR 37 (Main Street). The vitality evident in this area is indicative that additional development and traffic generation will occur during the planning period addressed by this thoroughfare plan.

6. Both the city and county land use plans present land use information within the area of the new bypass. The county plan provides more detail in that proposed land uses are separated into more specific categories. The city's plan only utilizes four categories – residential, mixed use, industrial, and commercial. The county's plan utilizes fifteen categories.

The residential category in the city's land use plan includes all types of residential development and densities (e.g., single-family through multifamily). Zoning districts are used to distinguish between land uses during the administrative process of approving new development. Without the support of more detailed land use planning the city relies on other information, such as the water and sewer studies, to further assist in guiding residential densities. The previously mentioned data that accompanies the water study presents more detail on land use density and location than does the future land use map in the City of Lancaster's Development Plan. In order to better facilitate transportation and utility planning, subsequent revisions of the city's land use plan map should differentiate between residential densities.

Review of the land use plans for the area in the vicinity of the new bypass indicates that most high traffic generating land uses are anticipated near the SR 188 intersection. This is in the vicinity of existing industrial land uses within the City of Lancaster. This area is also identified in both the city and county plans for future industrial development. The county's future land use plan for this area extends/expands industrial uses to the north of SR 188 at the bypass. South of the intersection land is identified for highway commercial, office and mixed use residential.

In the vicinity of the bypass and US 22 intersection, land is identified for office and suburban residential uses.

7. Major new developments that should be considered during this planning process, which are either underway or anticipated, include:

River Valley Highlands Subdivision – This subdivision, located off North Columbus Street, will contain 1,300 lots when fully developed.

Government Center- The County government service center, which is under construction on West Fair Avenue, will contain several county departments. It is anticipated that this will become a major facility providing services directly to residents of Fairfield County.

Chapter 3: Future Conditions – “Do Nothing”

The purpose and intent of this first future (year 2025) alternative, the “Do Nothing” scenario, is to determine the possible impact of making no additional improvements to the existing transportation infrastructure system beyond those projects which are currently funded and programmed to be constructed. In the field of travel demand forecast modeling this is often referred to as the “existing plus committed” roadway network - the conditions when all currently committed projects (those presently funded through construction) are completed.

3.1 *Impact on Transportation Network*

The effect of future residential, commercial and industrial projects will likely have the single-most significant impact on the transportation infrastructure in the city for the foreseeable future. Decisions made by local planning officials to identify appropriate densities and land uses will ultimately determine the amount of additional trips per day carried by local roadways.

The city currently contains a significant amount of land available for development as commercial, residential and industrial uses, as described in the previous section. During the conduct of a recent study, the “Master Plan for Water and Wastewater Improvements” (Malcom Pirnie, Inc.), these areas were identified and assessed to determine the water usage and sanitary flow, for the purpose of evaluating future water needs for the city. Based on varying levels of development activity, some areas were estimated to be only 10% developed by the year 2025 while others were anticipated to be up to 50% developed. Based on these calculations, the city considered that approximately 1,865 acres of currently vacant or available land may be developed for residential uses by the year 2025, while 963 acres and 677 acres may be built as commercial and industrial uses, respectively. The use of these calculations is preferred in order to maintain consistency between the Malcom Pirnie, Inc. study and the forthcoming Thoroughfare Plan.

Under these assumptions, using generally accepted trip generation rates from the ITE Trip Generation Manual, some estimates of future vehicle trips created by this development can also be made. The anticipated residential development over the next twenty-three years could generate additional vehicle trip-ends in the range of 31,000 to 34,000 per day. These new daily vehicle trips would be distributed across the existing roadway network, with a majority of trips being located in the west and northwestern areas of the city, where significant development opportunities exist.

In addition to new trips being generated by residential development, there are also those, which will be produced by commercial and industrial growth. Based on local development trends and the constraints imposed by the city zoning ordinance, the areas that are anticipated to experience commercial growth may produce daily vehicle trips in excess of 50,000 cars. Likewise, land currently zoned for industrial uses may contribute additional daily vehicle trips in excess of 30,000 cars on local roads. The amount of

additional daily vehicle trips will ultimately be determined by the type and scale of particular retail and industrial projects undertaken over the next twenty years.

The forecasting of future traffic volumes on local roadways is typically conducted with the use of travel demand software, where future vehicle trips can be forecasted under any variety of future conditions. The software permits a thorough analysis of an existing and future network of roadways utilizing multiple sets of parameters (such as trip generation rates, production/attraction factors, and population and employment growth) that affect traffic flows. This process produces a forecast that is reliable and widely accepted throughout the transportation planning field.

While the use of a travel demand software is not in the scope of this project, several basic and central elements in developing future traffic volumes can be assessed without such a software. For example, recent and historic volume growth trends can be analyzed to determine annual growth rates on state and local routes. These growth rates can provide valuable perspective into the evaluation of traffic growth alternatives. Additionally, estimating the development of vacant land under current zoning regulations can provide insight into the number of new vehicle trips, which may be distributed throughout the roadway network. The analysis of these factors, as described in this chapter, will provide sufficient data and understanding to guide the decision-making process and city policies to be set forth in the Thoroughfare Plan.

3.1.1 Daily Traffic Volumes

Over the past 10 years, the city has experienced moderately low population growth similar to many small urban areas throughout the state. Suburban and rural land continues to be developed at a high rate, and impacts on roadways in the form of increased traffic and congestion have become a hotly contested issue for residents, business owners, and public officials alike.

As mentioned in the “Fairfield County Development Strategy and Development Plan” dated year 2002, vehicular travel in and around Lancaster is radial in nature, as the city is situated at the confluence of four state routes and two US routes. Eleven county roads also terminate at these routes or the corporation limits, creating an ever-increasing bottleneck where vehicles struggle to enter or bypass the city through a limited number of access points.

In order to estimate the year 2025 traffic volumes for future conditions analysis, the following methodology is used in the absence of a travel demand model software.

- Future traffic growth rates are first assessed based on the historic traffic growth. This assumes that future growth continues at the historical annual growth rate.
- Growth rates are computed separately for state routes (state and federal routes) and city streets (non-state and non-federal routes), assuming that the travel

- patterns on state routes and city streets are different. Typically, state routes have shown to include a significant amount of through-traffic, whereas the majority of traffic on city streets could be characterized as local in nature – those that originate and terminate within the city.
- Growth rates on city streets are further adjusted based on the projected land use growth. This assumes that the projected land uses will have significant impacts on traffic growth within the city. This is described further in the next section.
 - Future traffic growth on existing US 33 is further adjusted based on the future impact of the completed US 33 Bypass. This adjustment assumes that all the through traffic currently using the existing US 33 facility will shift to the new bypass.

3.1.1.1 Traffic Growth on City Streets

Available historical traffic volume data shows that volumes on city streets have grown at an average annual rate of 0.50% since the year 1992. This data portrays the traffic growth that has occurred in the central part of the city over a long period of time. This may not reflect most recent growth at the edges of town where significant development has taken place. For example, at a location near the Big Bear shopping center on Main Street, traffic volumes have grown at an average annual rate of 15.9% over the past 5 years. This growth appears to be atypical, and likely reflect new vehicular trips originating in Perry County and in route to the RV Mall and Lowe's. These volumes may continue to increase along with development in Perry County and along US 33.

As discussed in Chapter 2, future growth is anticipated to occur primarily north and west/northwest of the existing city limits. The city has taken steps to plan for the provision of water and sanitary service to these areas. The county has adopted a land use plan that considers this area (and extending north along the US 33 corridor to the City of Canal Winchester) to be the primary growth area of the county.

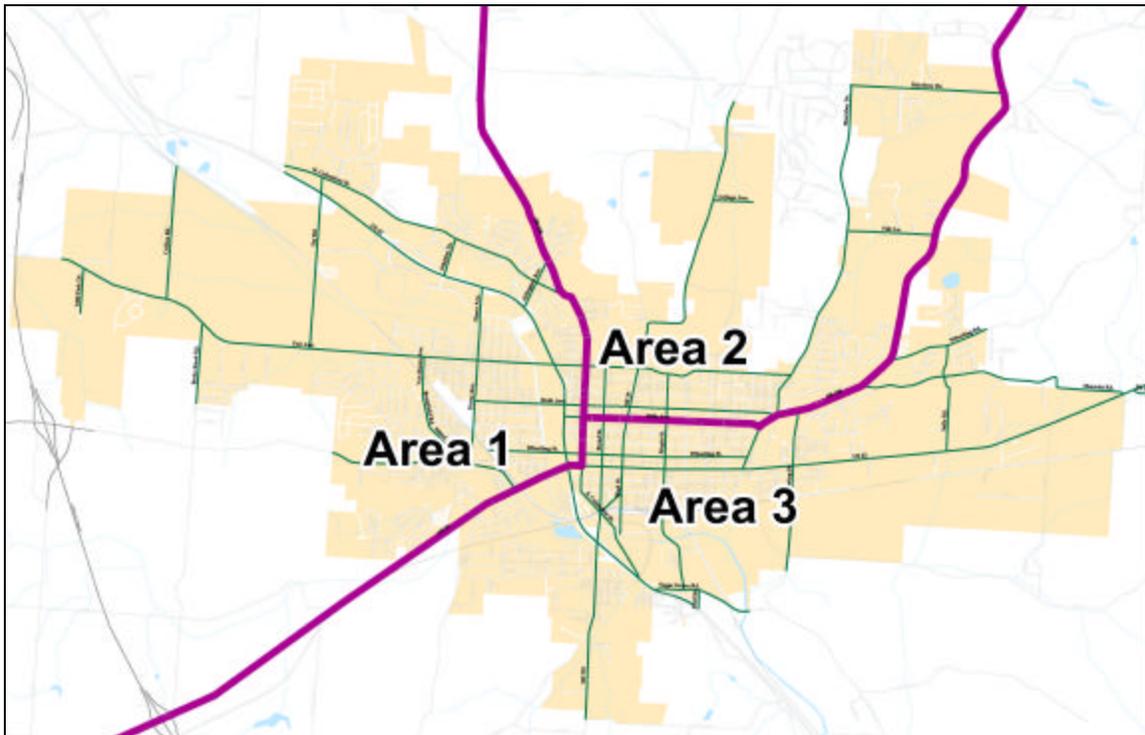
Based on these projected land use patterns and the completed construction of the new US 33 Bypass, historical growth patterns can be refined to reflect a more realistic portrait of future traffic conditions. It is reasonable to assume that all portions of the city will not have experienced the same levels or timing of development - in terms of density and intensity. For this purpose, the city is divided in to three areas as shown in Figure 3-1. These three areas are anticipated to experience varying levels of growth over the next twenty-three years, as follows:

- Area 1: City streets in this area will continue to grow at a rate equal to the historical rate of 0.50% annually. Additionally, due to the anticipated high level of growth in this area, it is projected that the historical growth rate may likely increase twofold. Therefore, for the purpose of this study, growth and development is projected to increase traffic on these roadways by an additional 0.50% through the year 2025.

- Area 2: City streets in this area will continue to grow at a rate equal to the historical rate of 0.50% annually. Additionally, due to the anticipated moderate level of growth in this area, it is projected that the historical growth rate may increase significantly. The growth in this area, while significant, may not occur as quickly as in Area 1 which will be directly influenced by the US 33 Bypass. Therefore, for the purpose of this study, growth and development is projected to increase traffic on these roadways by an additional 0.35% through the year 2025.
- Area 3: City streets in this area will continue to grow at a rate equal to or greater than the historical rate of 0.50% annually. Due to the anticipated low level of growth in this area, it is projected that this historical growth rate may not change significantly.

Based on this analysis and the assumptions discussed, the final annual traffic growth rates for city streets in areas 1, 2, and 3 are 1.00%, 0.85%, and 0.50% respectively.

Figure 3-1: Areas of Distinct Traffic Growth.



3.1.1.2 Traffic Growth on State Routes

Historic traffic volume data for state routes in the city reveals an average growth rate of 1.68% annually since the year 1992. When compared to general historic growth patterns across the state, as provided by ODOT (1.0% annually on state routes), this data shows that growth within the city is higher than other areas. While assessing the “Do Nothing” scenario, the impact of future traffic is examined as if these historic trends would

continue on state routes through the year 2025. This higher than “average” growth rate on state routes is realistic due to the completion of the US 33 Bypass, and the significance of the state routes’ roles in providing key east-west access to the Bypass. Projected traffic volumes under these growth conditions would resemble those shown on Figure 3-2. It should be noted that this figure reflects the impact of the US 33 Bypass, as discussed in the following section.

3.1.1.3 Travel Pattern with US 33 Bypass

The construction of the US 33 Bypass which, is currently underway, will significantly impact the regional travel generated by and passing through the City of Lancaster. With construction expected to be complete by 2005, the four-lane limited-access facility should ease traffic congestion on US 33 in the city as well as reduce travel times and delay for regional traffic.

Application of the historical annual traffic growth rate on state routes (1.68%) to the existing US 33 facility yields projections that show traffic volumes of 61,600 vehicles per day at the northern end of the roadway, 52,800 vehicles through the city, and 39,600 vehicles at the southern end. These projections, however, do not account for the impact of the Bypass on pass-through traffic.

According to a *draft* Origin/Destination Study conducted in 1994 by the Ohio Department of Transportation (ODOT), the following conclusions are drawn based on Origin-Destination (O-D) surveys. A copy of the O-D matrix from the report is included in Appendix C.

- Approximately 52% (7,054) of vehicles traveling southbound from point A, which is the north end on US 33, are pass-through traffic.
- Approximately 60% (6,965) of vehicles traveling northbound from point F, which is the south end on US 33, are pass-through traffic.

Presuming that these percentages are accurate at the present time, and utilizing currently available traffic volume data from the city, it is reasonable to estimate that approximately 11,700 southbound trips from the north end and 8,262 northbound trips from the south end on US 33 can be characterized as pass-through traffic at the time of this study. It is this segment of vehicular travel that the construction of the bypass is intended to capture, relieving the existing roadway of a significant portion of vehicles per day.

To understand the potential impact of the US 33 Bypass upon completion, and estimate the future impact on traffic volumes that would have otherwise made use of the existing US 33 facility, it is helpful to project the continuation of these regional travel patterns through the year 2025. Should these patterns remain similar, approximately 17,300 (52% of 33,270) southbound trips and 12,150 (60% of 20,200) northbound trips could be characterized as pass-through trips. Therefore, approximately 29,500 vehicles per day combined in both directions will be pass-through trips by the year 2025. By subtracting these projected directional pass-through vehicle trips from the total volumes along the

existing US 33 facility (as calculated using the historical growth rate), a more complete and practical projection can be determined.

The resultant projection shows that traffic volumes along the existing US 33 facility may remain somewhat stable over the next twenty years, as shown on Figure 3-2. This analysis shows that if pass-through traffic does relocate to the bypass as anticipated, the existing US 33 roadway should be able to operate at least as it does currently and possibly better assuming that the nature of trips on the roadway shifts toward those that are more local in nature.

3.1.2 Traffic Operational Issues and Concerns

Using the criteria described in section 2.1.4, level of service (LOS) is calculated for the study segments based under future (year 2025) “Do Nothing” conditions. Estimated LOS along study segments in the year 2025 “Do Nothing” scenario is shown in Figure 3-3.

Table 3-1 shows LOS conditions that are unacceptable under existing and future years for CBD and non-CBD areas.

Table 3-1: Unacceptable LOS Conditions.

	Existing Conditions	Future Conditions
CBD areas	E, F	F
Non-CBD areas	D, E, F	E, F

Those segments with unacceptable LOS under existing conditions will need to be addressed for improvements to prevent them from further worsening. However, there are certain segments that are currently operating at acceptable LOS but will be unacceptable under future “Do Nothing” conditions. These include:

- US 22 between the southwest city boundary and Boving Road (from LOS B to LOS E).
- US 22 between Livingstone Avenue and Kanawha Road (from LOS C to LOS E).

Figure 3-2: Estimated Traffic Volumes in Year 2025.

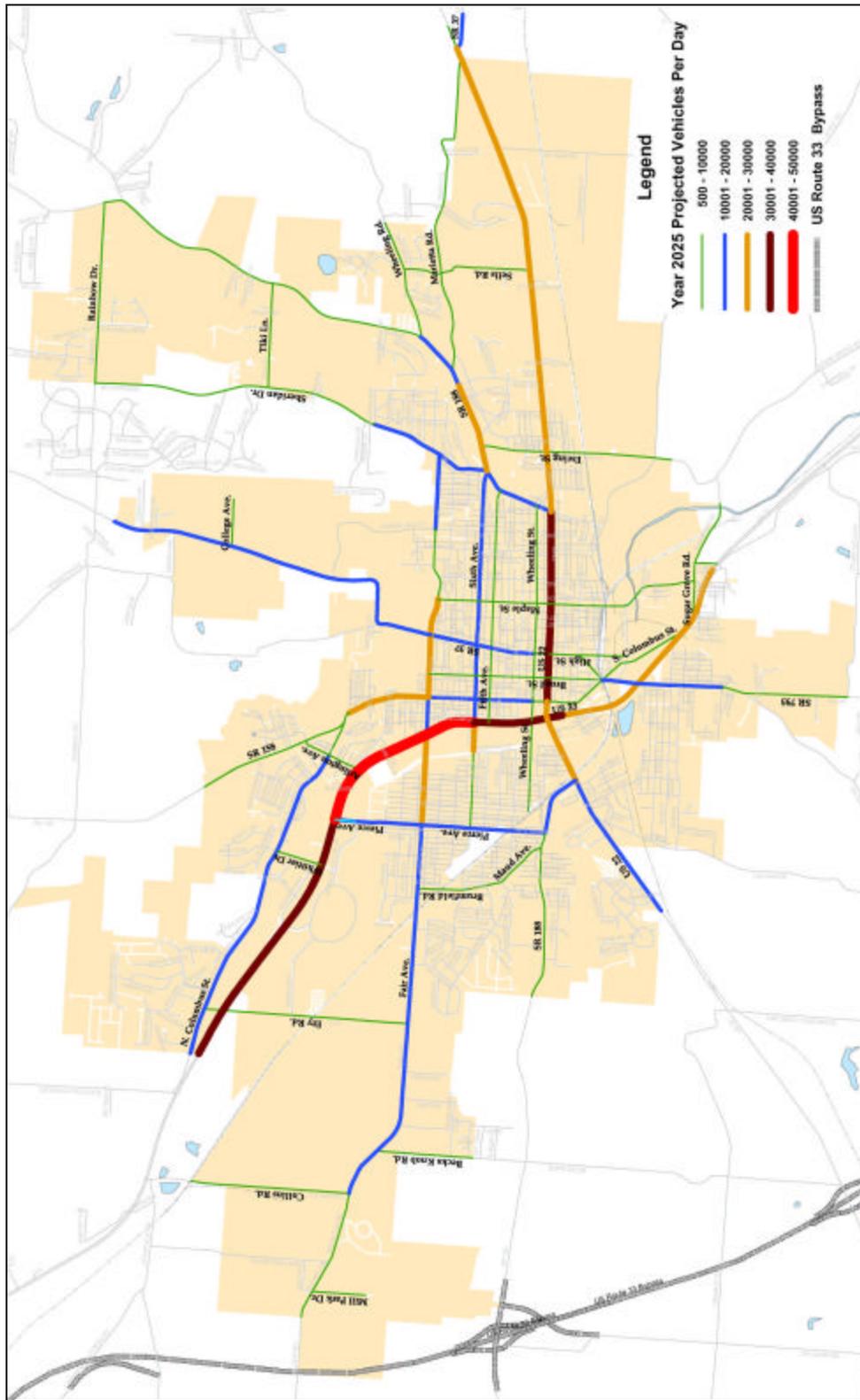
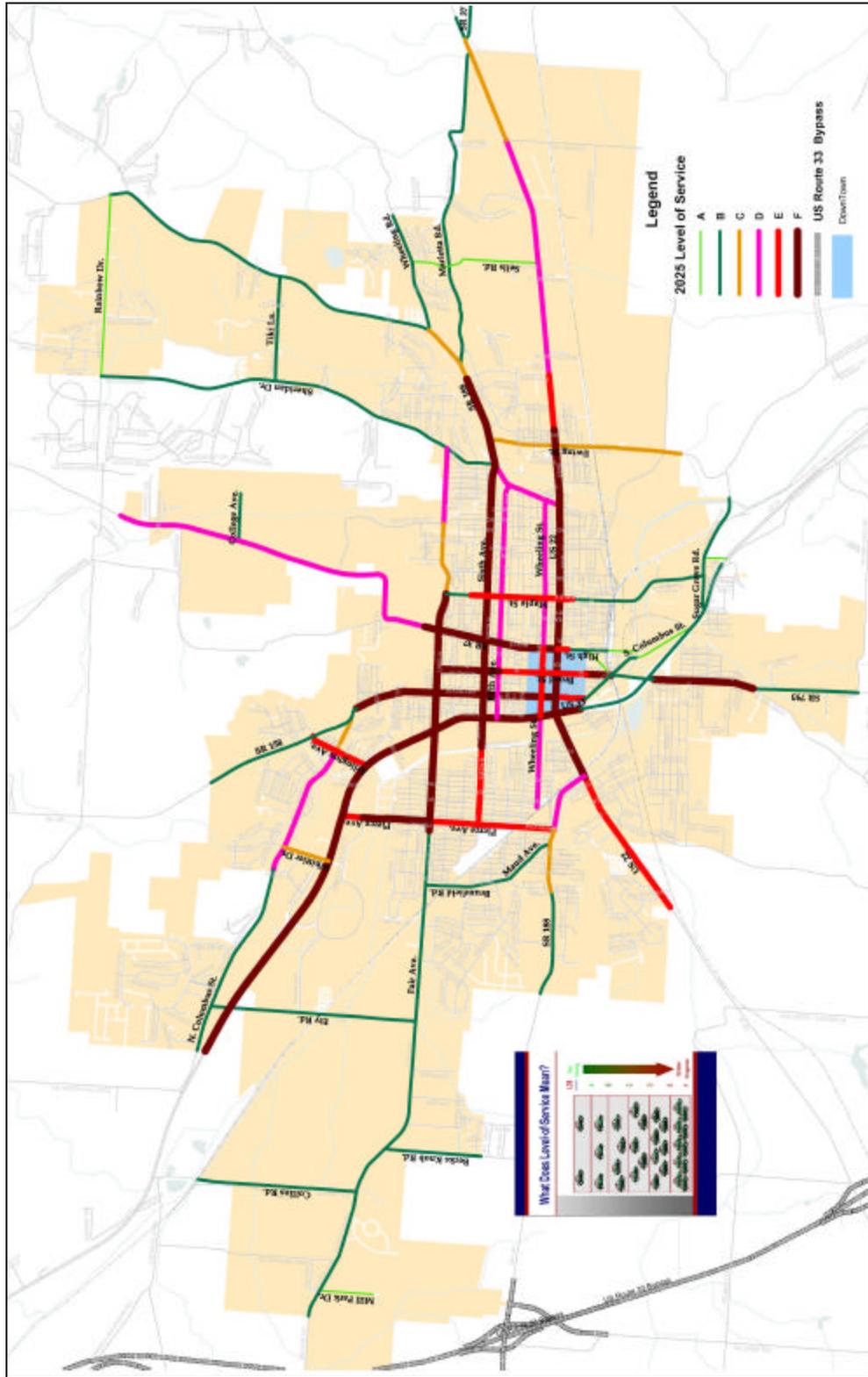


Figure 3-3: Year 2025 Level of Service along Study Corridors.



It must be noted that US 22 currently operates under unacceptable LOS between Boving Road and Livingstone Avenue (as indicated by LOS D, E or F in Figure 2-5) and future volume projections indicate that by 2025 the unacceptable LOS segment extends on both sides of the currently failing segment. As has been stressed earlier in this report, these LOS are based on planning level analysis only. Alternatives for improvement (discussed in the following chapters of this report) need to first focus on currently unacceptable LOS segments that are listed below:

- Pierce Avenue.
- Arlington Avenue.
- SR 158 (between North Columbus Street split and CBD).
- US 33 (between northwest city boundary and CBD).
- Broad Street (between Fair Avenue and South Columbus Street; between US 33 and Hamburg Road).
- SR 37 (between Fair Avenue and Main Street).
- Maple Street (between Sixth Avenue and Main Street).
- Fair Avenue (between Pierce Avenue and Maple Street).
- Sixth Avenue (between Pierce Avenue and Sheridan Drive).
- Fifth Avenue (between US 33 and Cherry Street).
- Wheeling Street (between Washington Avenue and Cherry Street – it must be noted that the portion of Wheeling Street that passed through CDB with current LOS D is acceptable but falls to an unacceptable LOS E under year 2025 “Do Nothing” conditions).
- US 22 (between Boving Road and Livingstone Avenue).

3.2 Impact on Socioeconomic Conditions

3.2.1 Land Use Issues

The impact of the “Do Nothing” scenario, as previously described, on future land use issues is likely to be minimal. The lack of an improved thoroughfare system alone is not likely to significantly impact or noticeably slow the development of future land uses. Table 3-2 indicates that the City of Lancaster is currently experiencing population growth at a slower rate than Fairfield County.

Table 3-2: Population Trends.

	1990 Census	2000 Census	% Change
Fairfield County	103,461	122,759	18.7
City of Lancaster	34,507	35,335	2.4

Source: Fairfield County Development Strategy and Land Use Plan, 2002

Based on the 2000 Census of the Population, the City of Lancaster comprised approximately 29 percent of the population on Fairfield County. With growth at a rate of less than three percent during the period, future rates of land development/consumption and population growth within the city is anticipated to be contingent on the implementation of the water/waste water planning currently underway and the city's annexation policies. Table 3-3 presents four different population projections for the county. The county's plan suggests that the most accurate projection is the cohort growth model and it is recommended for use in future planning. If the city maintains its current level of population growth relationship with the total county population (29 percent) the city's year 2020 population could be approximately 49,220 persons. Growth at this rate assumes the implementation of the city's water/sewer plans and continuance of its annexation policies.

Table 3-3: Fairfield County Population Projections.

Type of Projection	Year 2010	Year 2020
Linear growth	118,150	130,083
Constant growth	126,199	139,378
Cohort growth*	148,745	169,724
Dependency growth	212,837	324,984

Source: Fairfield County Development Strategy and Land Use Plan, 2002

* Recommended Projection for Planning Purposes

Future land use, as previously described in Section 2.2, is anticipated north and west/northwest of the existing city limits with infill development within the existing city limits comprising a portion of this new growth. Besides the extension of water and sewer service, which historically has been the primary catalyst for growth, the construction of the new US 33 Bypass can be anticipated to be a major catalyst for new growth and development. Access provided by this new roadway will encourage land development. As previously noted, both the city's development plan and the county's plan identify future commercial, industrial and both single and multi-family residential land uses in the vicinity of intersections of existing roads and the new bypass.

While it is not anticipated that the "Do Nothing" scenario will significantly impact the rate of new land use growth, the converse is, however, likely. In other words, new land development may significantly impact the existing roadway system serving the City of Lancaster and its environs. The lack of a definitive thoroughfare plan, prepared in conjunction with land use plans, will likely hinder the city's effectiveness in managing future development in regards to ensuring adequate transportation access. For example, a thoroughfare plan identifying routes of new major roadways and/or those roadways that need to be upgraded to handle anticipated land development provides the city with significant support to require improvements to implement the thoroughfare plan as part of the land development process. In this regards the plan helps assure that access control measures, connectivity between land uses/developments, sufficient rights-of-way and roadway pavement width, etc. are included at the initial stages of land development versus the potentially having to reconstruct roads after development is complete to handle increases in traffic generation.

3.2.2 Economic Development

It is anticipated that economic development issues will react similarly to other land uses in regards to the “Do Nothing” alternative. Access provided to new land by the US 33 Bypass will stimulate new industrial and commercial development, in conjunction with water and sewer extensions. Regardless of the development and implementation of a thoroughfare plan, these land uses will develop because access is provided by the bypass. Commercial land uses along existing US 33 that are anticipated to benefit because of the bypass should also continue to experience benefits. Other issues such as those caused by congestion and lack of access control would likely continue to increase or remain substantially unchanged with the “Do Nothing” scenario.

Chapter 4: List of Improvements

4.1 Introduction

Based on an analysis of the future “do-nothing” conditions as discussed in Chapter 3, at least one of the following three goals should be met by any improvement strategy. These goals address existing and potential problems identified earlier in this report.

1. Reduce Congestion - by reducing congestion, the City of Lancaster will see enhanced mobility and increased safety in traffic movement.
2. Reduce Truck Traffic within city limits – reducing the volume of trucks that currently go through the heart of the city will result in higher travel speeds and lower travel times. Citizens and members of the public have also identified passing truck traffic as a problem that needs to be addressed.
3. Establish local connections - identifying and establishing local roadway connections between parts of the city that are not directly connected today is important as it will create shorter routes for residents and/or help in economic growth if commercial areas are directly linked to potential customer locales.

4.2 Proposed Improvements

Each proposed improvements presented in this chapter will help in achieving at least one of the goals set forth above. They will also range from low cost improvements to high cost improvements. The proposed improvements fall under five categories as listed below:

1. Ring Road
2. New Connectors
3. Roadways Widening
4. Operational Changes
5. Driveway Access Management

These are planning level improvement strategies and they require further detailed engineering and feasibility studies before implementation. Such detailed studies might reveal a slightly different or modified alignment to be better suited; however, the concepts suggested by these improvement strategies are still valid.

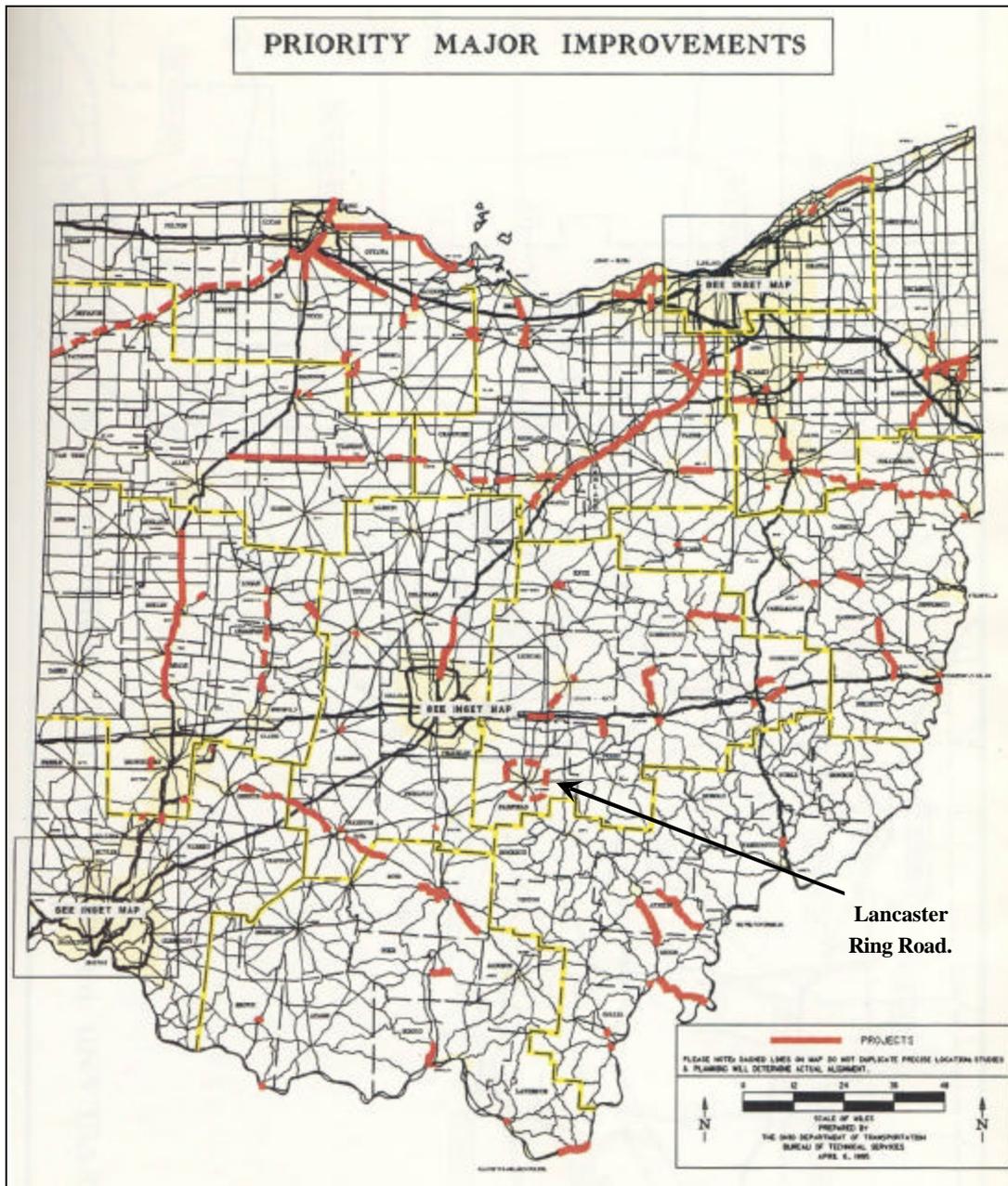
Spot-specific improvements are not part of this planning study and will not be addressed in this report.

A combination map that includes all the proposed improvements in a single figure is included in Appendix D. Discussions on proposed improvements are in the following sections.

4.2.1 Ring Road

The concept of a ring road around the City of Lancaster is not new – it has been a part of discussions that started with the US 33 and US 22 bypasses in early 1970s. ODOT, as part of an Access Ohio Micro Phase study conducted in 1995, identified a ring road around the City of Lancaster among the prioritized major improvement projects. A copy of the drawing from ODOT’s “Access Ohio – Micro Phase” dated June 1995 is shown in Figure 4-1 below.

Figure 4-1: Ring road concept for Lancaster as part of ODOT's "Access Ohio – Micro Phase" report.



Several state and US routes pass through the city of Lancaster that bring a lot of pass through traffic including trucks. Such commercial truck traffic passing through the heart of the city adds to already congested streets. A ring road would provide an alternative route for pass through traffic. It will not only provide relief to the streets within the city but also provide a better alternate access for the pass through traffic.

While the on going US 33 limited access bypass construction on the west side of the city can divert some through traffic away from the heart of the city when it is completed, there are other state and US routes whose through traffic cannot be served by the US 33 bypass. The through traffic from such routes will continue going through the downtown areas. Thus the US 33 bypass by itself can not solve all the through traffic problems. An ideal solution would be to provide a limited access bypass on the east of the city that can accomplish the full ring road as identified in ODOT's Access Ohio document. Given the limited amount of budget available with ODOT for new projects, it may not be possible to accomplish a limited access ring road for several years. Therefore, the majority of the interim ring road identified as an improvement in this report utilizes the existing street system with only two new links to complete a by-pass route for through traffic from the state and US routes. This interim ring road is not intended to replace any US 22 bypass which will still be required. Figure 4-2 shows a conceptual alignment of this ring road.

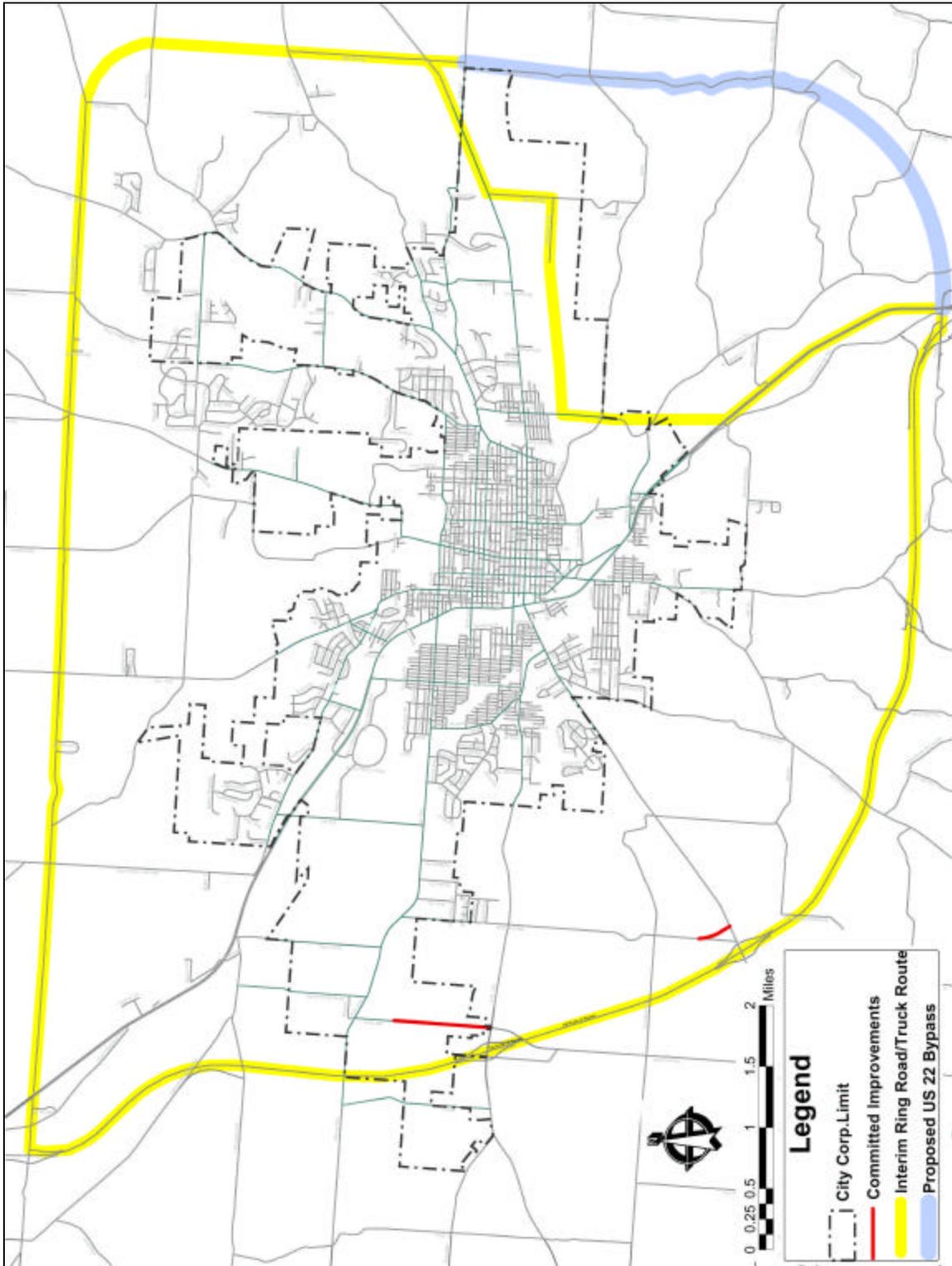
The interim ring road can accommodate the following routes:

- US 22 Truck route
- New SR 37 route
- New SR 188
- Truck access between the different state routes without having to go through the downtown of the city.

Fairfield County is already considering relocating SR 188 through Coonpath Road. The interim ring road will serve this purpose and extend truck routes to other state and US routes as well.

By eliminating pass through traffic and the truck traffic from going through the city, the interim ring road meets goals 1 and 2.

Figure 4-2: Interim Ring Road for the City of Lancaster.



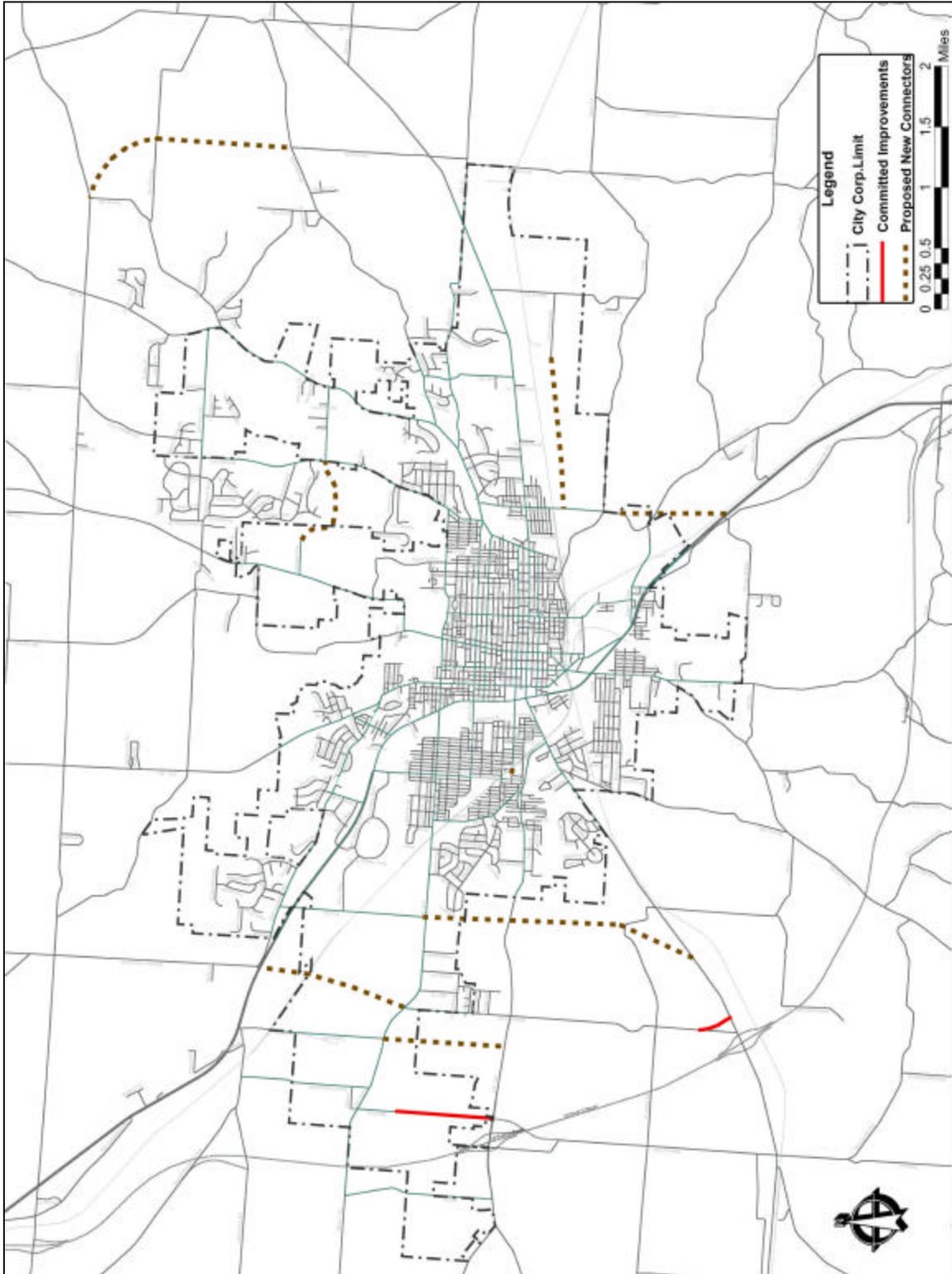
4.2.2 New Connectors

With new developments and growth in the city, there is a need for new connectivity in terms of new streets that become necessary to sustain such growth. Figure 4-3 shows the proposed new connectors that will provide such connectivity. These proposed connectors are based on several factors including completion of a ring road as mentioned above. Other new connectors are proposed to achieve one or more goals mentioned at the beginning of this chapter.

As shown in Figure 4-3, the following new connectors are proposed:

- Extend Collins Road south from Fair Avenue to SR 188 – this connector will provide direct access (achieving goal 3) between US 33 and SR 188 and relieve congestion on Fair Avenue (achieving goal 1).
- Extend Ety Road south from Fair Avenue to US 22 through SR 188 and Crumley Road - this connector will provide local connections (goal 3) between Fair Avenue, SR 188 and Crumley Road.
- Extend Becks Knob Road north from Fair Avenue to US 33 at Election House Road – this connector will reduce traffic (goal 1) on Ety Road by providing an alternate connection (goal 3) between US 33 and Fair Avenue.
- Extend College Avenue to Sheridan Drive at Tiki Lane – this connector will provide connection (goal 3) between SR 37 and Sheridan Drive.
- Extend Wheeling Street west across the railroad tracks to Pierce Avenue – this extension of Wheeling Street will provide access between residential neighborhoods (goal 3) west of Pierce Avenue and US 33.
- Extend Ewing Street south across Sugar Grove Road to US 33 at Stump Hollow Road – this connector will help achieve the Ring Road mentioned in the earlier section, thus meets goals 1 and 2.
- Connect Snoke Hill Road north of Wheeling Road to Coonpath Road at Darfus Road – this connector will help achieve the Ring Road mentioned in the earlier section, thus meets goals 1 and 2.
- Extend Commerce Street west to Ewing Street south of the Lancaster Glass facility – this connector will help achieve the Ring Road mentioned in the earlier section, thus meets goals 1 and 2.

Figure 4-3: Proposed New Connectors



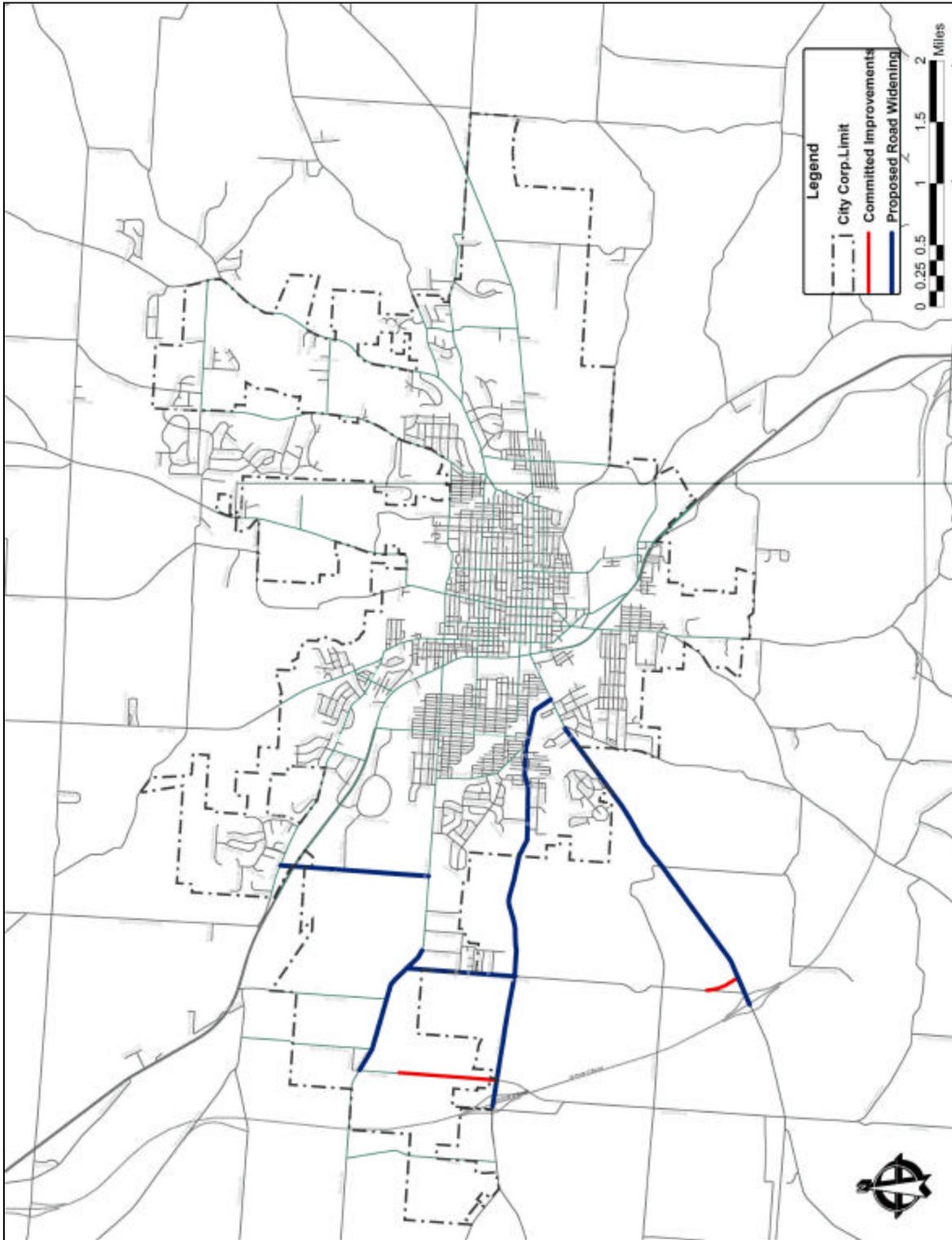
4.2.3 Roadways Widening

Widening roads will enable providing adequate travel lanes to accommodate projected traffic flows. The actual width of the widened roads will need to be designed based on detailed engineering studies. Most of the road widening is proposed in the western part of the city towards the US 33 Bypass. Figure 4-4 shows the roadways that are proposed for widening and each of them is listed below:

- Widen US 22 from Boving Road to US 33 Bypass – this will accommodate future development and the related increase in traffic brought about by the US 33 Bypass.
- Widen SR 188 from US 22 to US 33 Bypass - this will accommodate future development and the related increase in traffic brought about by the US 33 Bypass.
- Widen Fair Avenue from Barr Drive west to Mill Park Drive – this will create a uniform stretch of Fair Avenue.
- Widen Beck's Knob Road– this widening will combine with the proposed new connector between Beck's Knob Road and US 33 (as discussed in the previous section).
- Widen Ety Road – this widening will combine with the proposed extension of Ety Road south of Fair Avenue all the way to US 22 (as discussed in the previous section).

Roadway widening creates additional capacity and helps in relieving congestion which is goal 1.

Figure 4-4: Proposed Roadway Widening.



4.2.4 Operational Changes

Operational changes are an effective method of significantly improving traffic flow under conditions such as those that are observed in and around the downtown central business district, where other improvements are difficult to accommodate. Comparatively, operational changes are low cost improvements and can be implemented in a much shorter time frame. Operational changes proposed as part of this study fall into the following three categories:

1. One-way Street Operations
2. On-street Parking Restrictions
3. Unwarranted Signal Removal & Multiway STOP Sign Removal

Operational changes may require people to make changes in their travel patterns. However, when the changes are made collectively on several streets and alternative choices are provided to the businesses and residents, the traffic congestion on the streets can be relieved significantly. Public notification and education of such changes in a timely fashion is important to ensure that the operational transition occurs smoothly. Proposed operational changes are shown in Figure 4-5 and discussed below.

4.2.4.1 One-way Street Operations

Converting a two-way street operation on a roadway to a one-way street operation provides the following benefits:

- Removes conflicting movements – fewer conflict points translates to a lesser potential for traffic crashes.
- Improves signal coordination – resulting in lower travel times and smoother flow of traffic.
- Improves left turn and right turn operations – through traffic is no longer slowed down by turning vehicles.
- Improves capacity (throughput) – higher traffic volumes can pass through the roadway segment which results in a better LOS as shown in Figure 4-6.

Figure 4-5: Proposed Operational Changes.

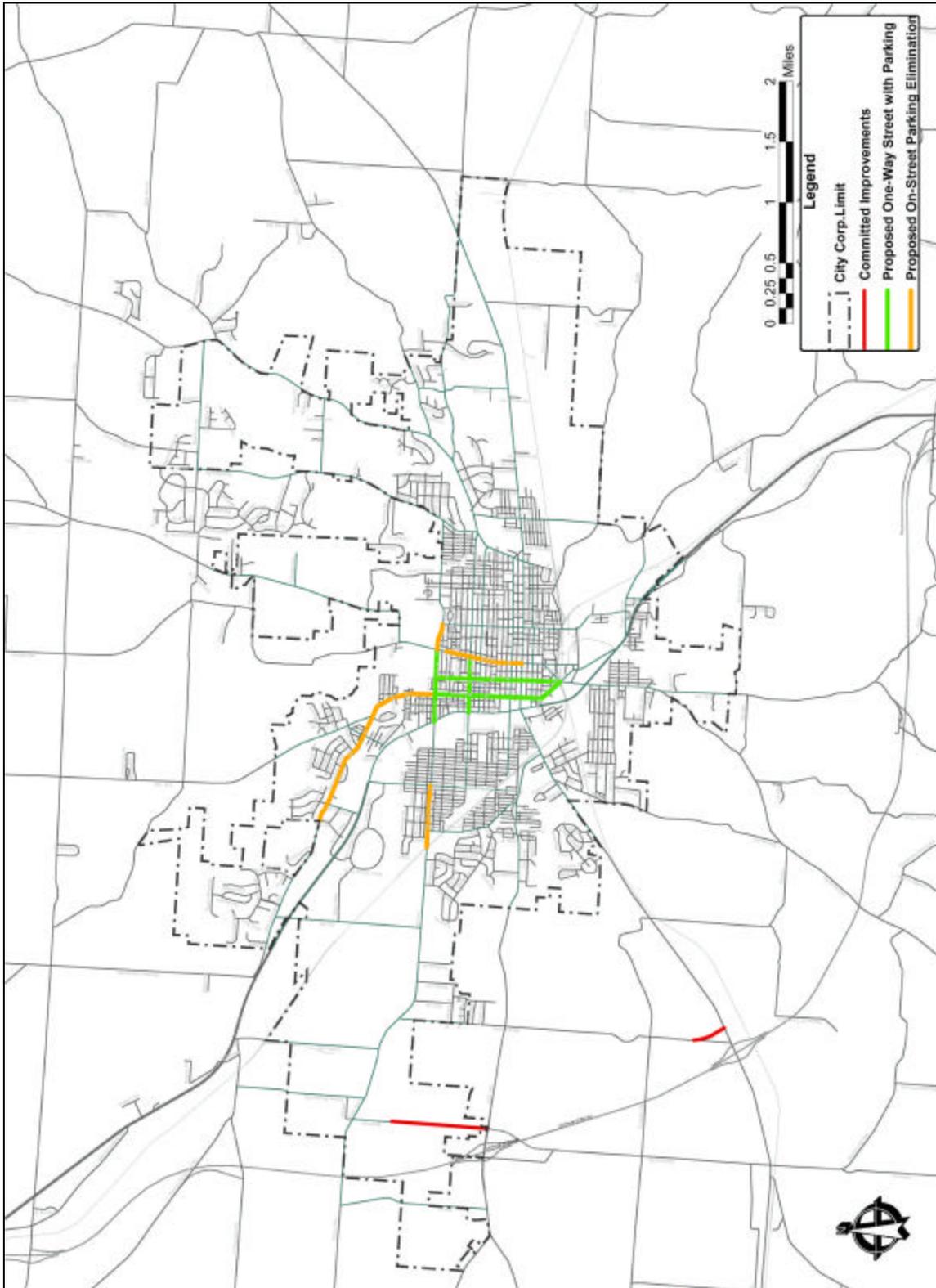
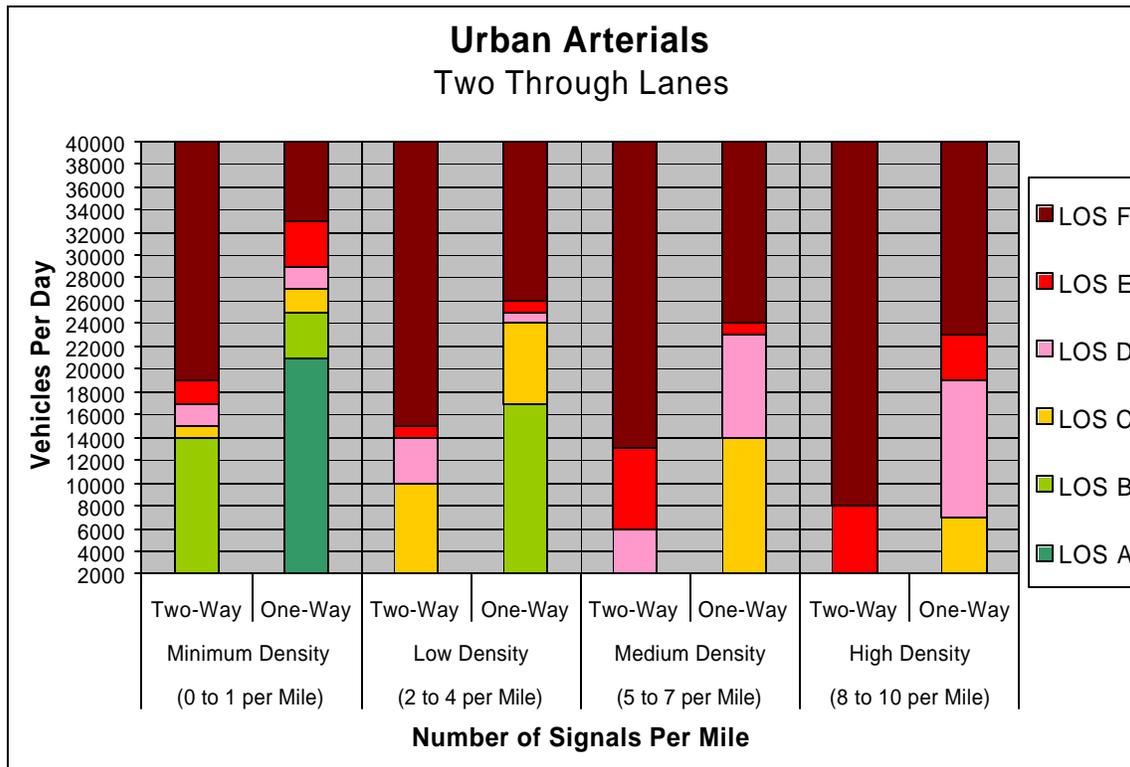


Figure 4-6: Comparison of Two-Way vs. One-Way Operations.



However, when an existing two-way road is changed to a one-way operation, it is important to have a nearby parallel route to accommodate the traffic traveling in the other direction. Hence any operational one-way change is better made in couplets or triplets, i.e., two or three parallel and nearby streets are operationally changed together to provide adequate capacity for traffic flow in both directions.

The change to a one-way operation will help reduce congestion (goal 1) and is proposed for the following sets of streets:

- Columbus Street and Broad Street – these streets are proposed to be converted to one-way operations between Fair Avenue and their intersection south of downtown in the north-south directions.
- Fair Avenue and Sixth Avenue – these streets are proposed to be converted to one-way operations between US 33 and High Street. Fair Avenue would be one-way west bound and Sixth Avenue would be one-way east bound.

4.2.4.2 On-street Parking Restrictions

Eliminating existing on-street parking provides the following advantages:

- Eliminates friction between the through traffic and in/out vehicles from parking spots
- Adds through capacity
- Accommodates left turn lanes

However, when existing on-street parking is eliminated, it must be ascertained that alternate parking choices are available. To make way for additional lanes of travel (helping achieve goal 1) the following locations are proposed for elimination of on-street parking, as depicted in Figure 4-5:

- High Street – between Main Street and Lake Street.
- Fair Avenue – between Maple Street and High Street and between Pierce Avenue and the railroad crossing.
- Columbus Street – between Fair Avenue and SR 158 split on the east side of street only. A center turn-lane can be achieved while still maintaining on-street parking on the west side of Columbus Street in this section.
- Columbus Street – between SR 158 split and Hillcrest Drive.
- At all high traffic volume intersections on-street parking is recommended to be eliminated from a distance adequate to allow appropriate room to install left turn lanes.

4.2.4.3 Unwarranted Signal Removal & Multiway STOP Sign Removal

A traffic signal is not always warranted. An unwarranted traffic signal impedes traffic flow and operations and its removal can provide the following benefits:

- Improved signal coordination
- Reduced signal density along the roadway segment which in turn improves capacity/throughput (as shown in the LOS criteria charts included in Appendix A of Memorandum 1 and in Figure 4-6 above)
- Decreased maintenance costs saving time and money.

An existing traffic signal can not be removed unless a thorough signal warrant analysis is conducted as per the Ohio Manual of Uniform Traffic Control Devices (OMUTCD). It is suggested that the city of Lancaster establish a program to investigate intersection traffic control at city intersections, under which signal warrant analysis could be conducted to remove any unwarranted signals in the city. It is suggested that investigations be carried out as follows:

- Using the traffic counting program already in place to conduct signal warrant analyses based on traffic volumes as specified in OMUTCD for warrants 1, 2, 9 and 11. At a minimum it is recommended to perform these analyses for Medium and High Signal Density segments.
- Whenever roadway improvements are planned, revisit the traffic volumes at affected intersections to check for signal warrants as per OMUTCD. If any signals are found not to be warranted, they can be eliminated as part of the improvements.
- Conduct crash analyses to identify intersections with a high occurrence of rear-end or other signal related collisions.
- When citizen complaints regarding high delays and travel times on roadway segments are received, it is suggested that elimination of unwarranted signals be considered as a corrective action to make improvements.

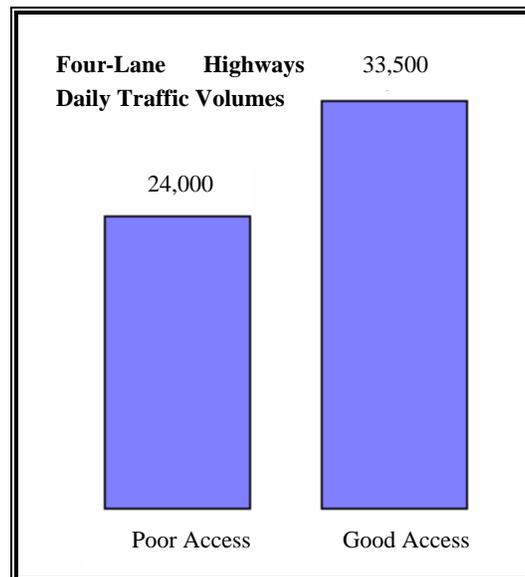
Multiway STOP signs could over time become unnecessary, for example, when traffic pattern changes. Typically multiway STOP signs are used where the volume of traffic on all the approaches is approximately equal. OMUTCD contains warrants for installation of multiway STOP signs. It is recommended that multiway STOP sign locations be analyzed for such warrants and appropriate action be taken – either elimination of the multiway STOP sign control or conversion to two-way STOP sign control.

4.2.5 Driveway Access Management

Access Management is a process that provides (or manages) access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. An effective access management policy is a tool to preserve the capacity of the existing and future street system. As defined above, access management preserves travel capacity while enhancing traffic safety. Figures 4-7 and 4-8 show the benefits of access management

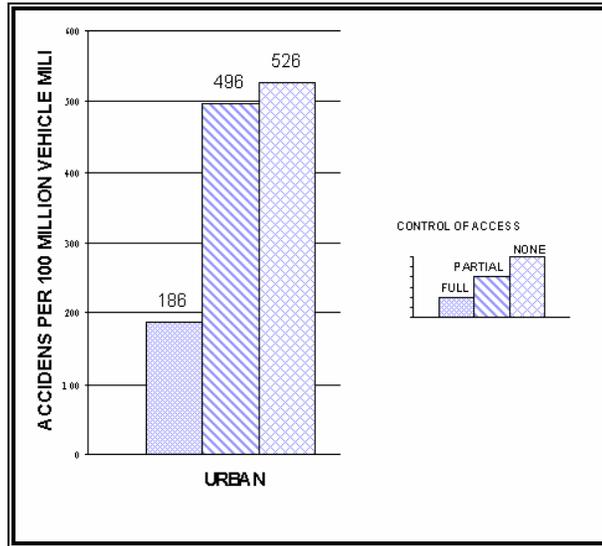
The city of Lancaster currently does not have a documented access management policy. When spacing, location and design of driveways on highways are designed according to standards policies, there is a tangible improvement in traffic operations and in levels of service along highways. Hence it is recommended that the city adopt and implement an access management policy which can meet goal 1.

Figure 4-7: Highway Capacity with and Without Access Management.



SOURCE: “Access Management – A key to Safety and Mobility: An ITE Information Report”, Institute of Transportation Engineers.

Figure 4-8: Safety with and without Access Management.



SOURCE: "Access Management for Streets and Highways", Federal Highway Administration, Report FHWA-IP-82, June 1982.

4.3 Cost Estimates and Project Rankings

The following table shows the summarized list of projects that are identified in section 4.2 above. A total of sixteen (16) projects are recommended with costs and priority rankings for implementation. Costs shown in the table are planning level cost estimates that need to be reevaluated as each project moves into the design. For the first six projects, a second set of costs are shown and these costs apply only if they are executed by the City staff.

Each project in the table is ranked with numbers between 1 and 16. Rank 1 indicates the first project that should be implemented. The rankings are prepared based on the costs and the current and future transportation infrastructure needs. The rankings were finalized based on the discussions with the Steering Committee.

Table 4-1: Cost Estimate and Project Rankings for Proposed Improvements.

Location	Type of Improvement					Ranking	Total Costs Using Contractor	Total Costs Using City Staff *
	Roadway Widening	Roadway Extension	One-way Streets	Parking Removal				
High St. (Main St. to Lake St.)				X		1	\$34,200	\$3,420
Columbus St. (Fair Ave. to Hilcrest Dr.)				X		2	\$74,700	\$7,470
Fair Ave. (Pierce Ave. to RR Xing)				X		3	\$24,300	\$2,430
Fair Ave. (Maple St. to High St.)				X		4	\$11,700	\$1,170
Fair Ave./Sixth Ave. (US 33 to High St.)			X			5	\$108,000	\$64,800
Broad St./High St. (Fair Ave. to their int. south of Main St.)			X			6	\$225,500	\$135,300
Fair Ave. (Barr Dr. to Mill Park Dr.)	X					7	\$3,544,000	N/A
South East Interim Ring Rd (Int. of Main St. and Quarry to Int. of Extended Ewing St. and US 33)	X	X				8	\$18,085,000	N/A
Collins Rd. (Fair Ave. to SR 188)		X				9	\$3,192,000	N/A
Wheeling Rd. (Pierce Ave. to RD Xing)		X				10	\$578,000	N/A
SR 188 (US 22 to US 33 Bypass)	X					11	\$16,525,000	N/A
US 22 (Boving Rd. to US 33 Bypass)	X					12	\$13,950,000	N/A
Snoke Hill Rd. (US 22 to Coonpath Rd.)	X	X				13	\$17,285,000	N/A
Ety Rd. (Old Columbus Rd. to US 22)	X	X				14	\$11,322,000	N/A
College Ave. to Tiki Ln.		X				15	\$2,000,000	N/A
Becks Knob Rd. (Fair Ave. to US 33)		X				16	\$7,238,000	N/A
							\$94,197,400	N/A

* Material Costs

Chapter 5: Roadway Functional Classification System

5.1 Introduction

A functional classification system provides a hierarchical organization of roadways, streets and highways based on their function and the type of services they are intended for. Such a classification enables the roadway system to operate independently as well as provide a progressive transition in the flow of traffic from the provision of access to the provision of movement in an interconnected network.

The roadway system is generally classified into distinct functional groups. For a road designer, this enables him/her to relate the geometric and structural design standards to the road under different classes. For a planner, it provides a basis for long term planning where different priorities could be assigned to different classes. In general, as indicated in Figure 5-1, the roadway system is classified by relating the proportion of through movement to the proportion of access. Interstates and freeways are at the top end providing the function of moving vehicles at higher travel speeds, while collectors and local streets at the lower end of the spectrum provide access to properties and have little or no through movement of traffic. Figure 5-2 shows a typical functional classification system and each of the classes are defined below.

Figure 5-1: Functional Classification System Hierarchy.

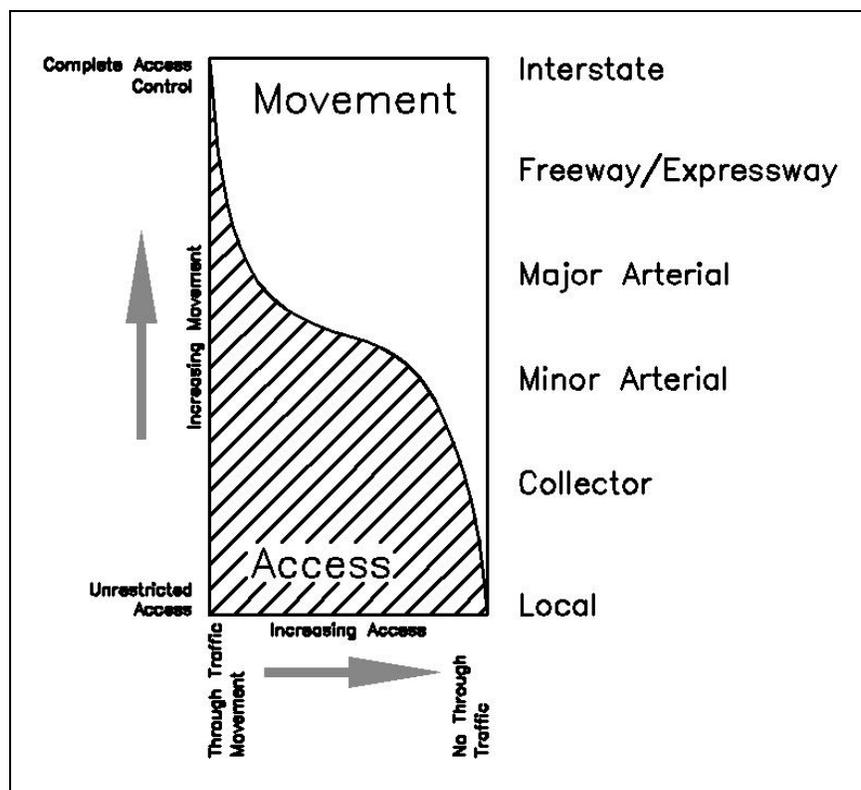
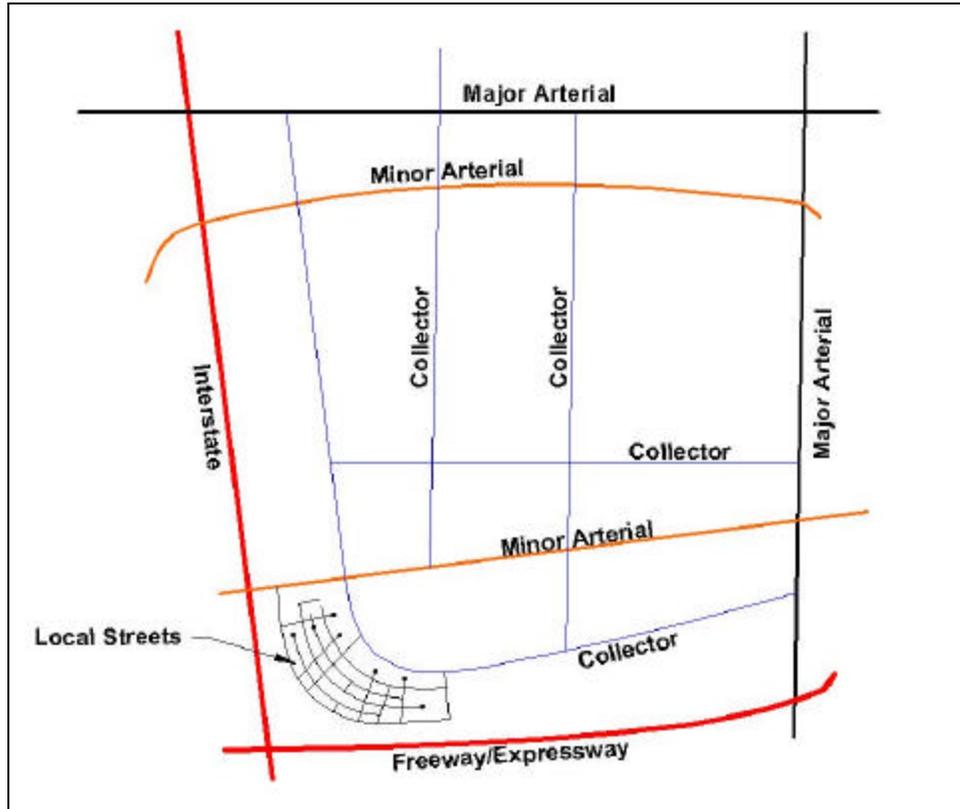


Figure 5-2: Typical Roadway Functional Classification System.



The functional classification system in the state of Ohio is based on the Federal Highway Administration's (FHWA) Highway Functional Classification – Concepts, Criteria and Procedures manual revised in 1989. As per this manual, Lancaster's roadway system is classified as an urban system (small urban area with a population of more than 5,000) with the following classes as defined below.

5.1.1 Principal Arterials

These facilities provide for the rapid and efficient movement of large volumes of traffic to serve major activity centers and longest trip demands. They provide connectivity between regions, continuity for trips entering and leaving urban areas while carrying a high proportion of the total urban travel with a minimum of mileage.

Principal arterials are further divided into the following sub-classes:

1. Interstate highways
2. Freeways/Expressways that also have controlled access
3. Other arterials – for the purpose of this report, such principal arterials (non-interstate highways, non-freeways/expressways) will henceforth be referred to as **Major Arterials**.

Parking, loading and unloading of goods and pedestrian traffic are not permitted on the interstate highways and freeways/expressways. On major arterials, parking, loading and

unloading of goods are usually restricted and regulated, pedestrians are allowed to cross only at intersections.

5.1.2 Minor Arterials

These facilities typically serve as connections to major arterials and facilitate movement of large traffic volumes over shorter distances compared to major arterials. Minor arterials provide more access to land and property than major arterials, but direct access to abutting property is a minor function and hence access should be carefully managed to avoid adverse impacts on the movement function intended for such facilities. In urban areas, Minor arterials distribute traffic to smaller geographic areas than those served by major arterials. For example, they may accommodate local bus routes to provide intra-community continuity, but ideally they should not penetrate identifiable residential neighborhoods. The spacing of urban minor arterials may vary from 1/8 -1/2 mile in the central business district to 2 -3 miles in the suburban fringes, but should normally be not more than one (1) mile in fully developed areas. Parking, loading and unloading are usually restricted and regulated on minor arterials, while pedestrians are allowed to cross only at intersections.

5.1.3 Collectors

Collector streets provide for a balance of traffic movement and property access functions. Traffic movement is often internal to localized areas, with collectors connecting residential neighborhoods, parks, churches, commercial/industrial areas, etc. with the minor arterials. Normally, full access is allowed on these streets from abutting properties. There are few parking restrictions except during peak hours. As compared to arterial streets, collectors accommodate smaller traffic volumes over shorter distances.

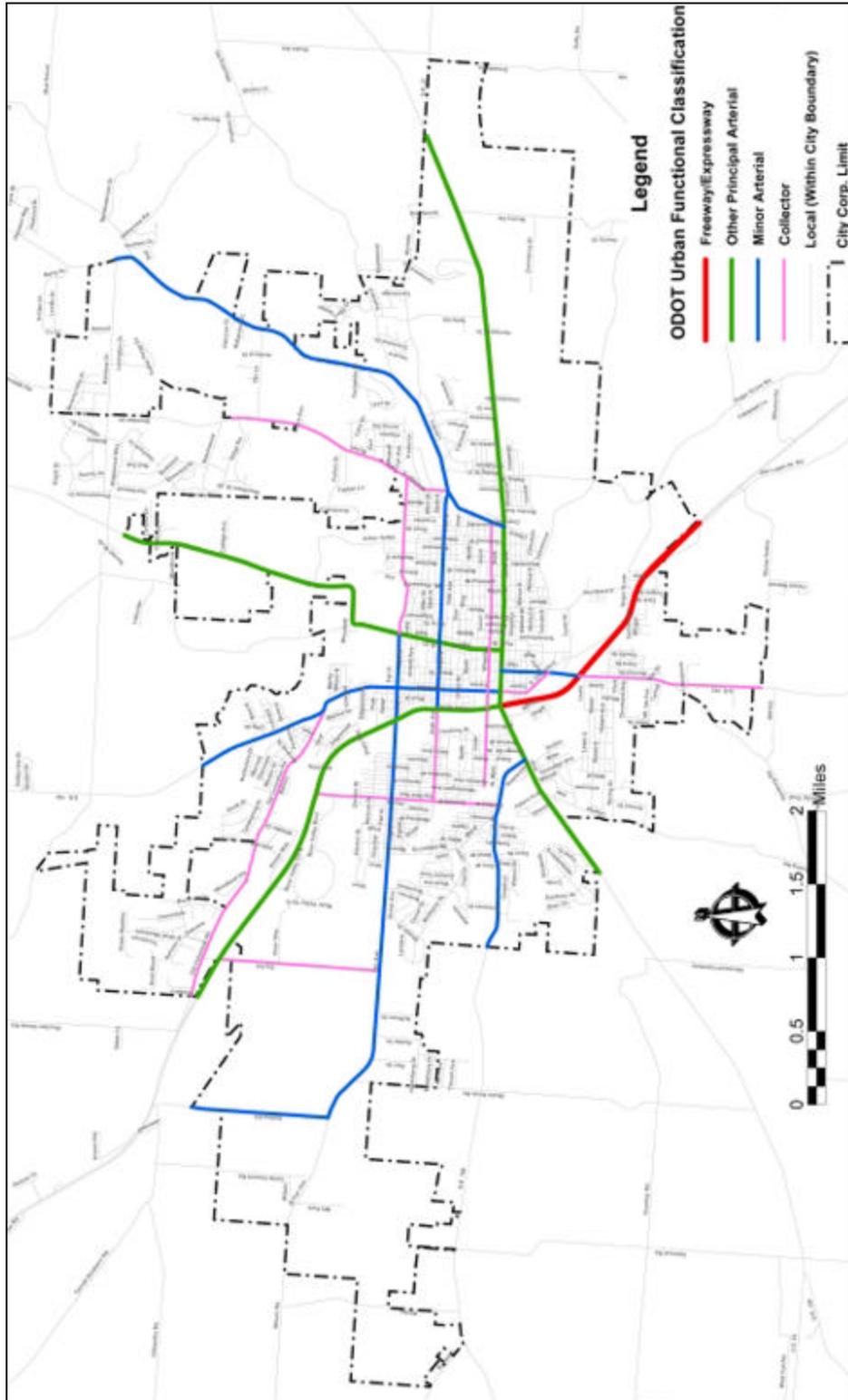
5.1.4 Local Streets

A local street is primarily intended to provide access to residences, businesses or other abutting property. Such a street normally does not carry a large volume of traffic. The traffic carried either originates or terminates along its length. A local street may be residential, commercial or industrial, depending upon the prominent use of the adjoining land. A local street allows unrestricted parking and pedestrian movements.

5.2 Existing Functional Classification System

The Ohio Department of Transportation (ODOT), in cooperation with the local jurisdictions reviews and assigns functional classes to all the roadways in the state of Ohio after every decennial US Census. The current functional classification for the City of Lancaster roadway network is shown in Figure 5-3.

Figure 5-3: Existing ODOT's Roadway Functional Classification for the City of Lancaster.



The City of Lancaster streets in each functional class are as follows:

- Interstates – None.
- Freeways/Expressways – US 33 south of Main Streets.
- Major Arterials – US 33 (other than the portion mentioned above), US 22, SR 37
- Minor Arterials – SR 158, SR 188, Fair Avenue (between Collins Road and SR 37), Collins Road, Broad Street (Between US 33 and US 22), Sixth Avenue (between Pierce Avenue and US 33).
- Collectors – SR 793, Wheeling Road, Columbus Road, Fair Avenue (other than the portion mentioned above), Pierce Avenue, Ety Road.
- Local streets – all streets not mentioned above.

5.3 Proposed Functional Classification System

Based on the proposed improvements discussed in Chapter 4, the current functional classification system (Figure 5-3) was reexamined. The functional classification system recommended by the Fairfield County Thoroughfare Plan was also reviewed. A revised functional classification is recommended to reflect this information. The proposed roadway functional classification system for the City of Lancaster is shown in Figure 5-4 and changes from the current ODOT classification are listed below. A bigger version of the map in black and white (that can be photocopied) is also included in Appendix D.

Changes based on the Fairfield County Thoroughfare Plan:

- SR 188 – Between US 33 and the western boundary of the City is changed from a Minor Arterial to a Major Arterial.
- SR 188 – Between US 22 and the northern boundary of the City is changed from a Minor Arterial to a Major Arterial.
- SR 793 – Between US 33 and the southern boundary of the City is changed from a Collector to a Major Arterial.
- SR 158 – Between US 22 and the northern boundary of the City is changed from a Minor Arterial to a Major Arterial.

Changes based on the improvements discussed in Chapter 4.0:

- Fair Avenue – between Collins Road and the western boundary of the City is changed from a Local Street to a Minor Arterial.
- Ety Road – between US 33 and US 22 is classified as a Minor Arterial.
- Collins Road extension – between Fair Avenue and SR 188 is classified as a Minor Arterial.
- Mill Park Road – between Fair Avenue and SR 188 is classified as a Collector.
- Beck's Knob Road – Between US 33 and SR 188 is classified as a Collector.
- Broad Street – between US 22 and Fair Avenue is classified as a Collector.

The following changes reflect the proposed ring road/truck route discussed in Chapter 4.0:

- Coonpath Road – between US 33 Bypass and Snoke Hill Road (via the proposed new connector between Snoke Hill Road and Coonpath Road as depicted in Figure 4-2) is classified as a Major Arterial.
- Ewing Street – between Commerce Street and US 33 is classified as a Major Arterial.
- Commerce Street – between Ewing Street and Quarry Road is classified as a Major Arterial.
- Quarry Road – between US 22 and Commerce Street is classified as a Major Arterial.
- Snoke Hill Road – between US 22 and Wheeling Road is classified as a Major Arterial.

5.4 Roadway Design Standards

Roadway design standards typically specify the total roadway widths and number of travel lanes by functional classification, including the width of travel lanes, design speeds, width of medians and provision for parking, etc.

Recommended roadway cross sections for the City of Lancaster were developed based upon local conditions and preferences, American Association of State Highways and Transportation Officials (AASHTO) and Institute of Transportation Engineers (ITE) guidelines.

Recommended roadway cross section standards for each functional classification are discussed in the following sections. This report does not include discussion about design standards for Freeways/Expressways which are controlled by ODOT.

5.4.1 Cross Section Standards for Major Arterials

Recommended roadway cross section standards for major arterials preserve a right-of-way (ROW) of either 120 feet or 100 feet. The typical roadway section for a 120 foot ROW includes sufficient width for 12-foot travel lanes and a 22-foot median, as shown in Figure 5-5. In addition, a 13-foot border area is preserved on each side of the roadway for curbs, utilities, and sidewalks. Initially, for low volume areas, a major arterial can be developed with only four 12-foot lanes and a 46 foot median, and expanded as traffic volumes warrant to the ultimate cross section. Due to their primary function of traffic movement and not traffic access, major arterials should include a raised median and not a continuous two-way left turn lane. The raised median should be a minimum of 22 feet to accommodate a 14-foot left turn lane at intersections with a six-foot median and curbs remaining. In addition, the 22-foot width will permit a one vehicle storage area for traffic crossing the arterial or turning from a cross street.

Figure 5-4: Proposed Roadway Functional Classification.

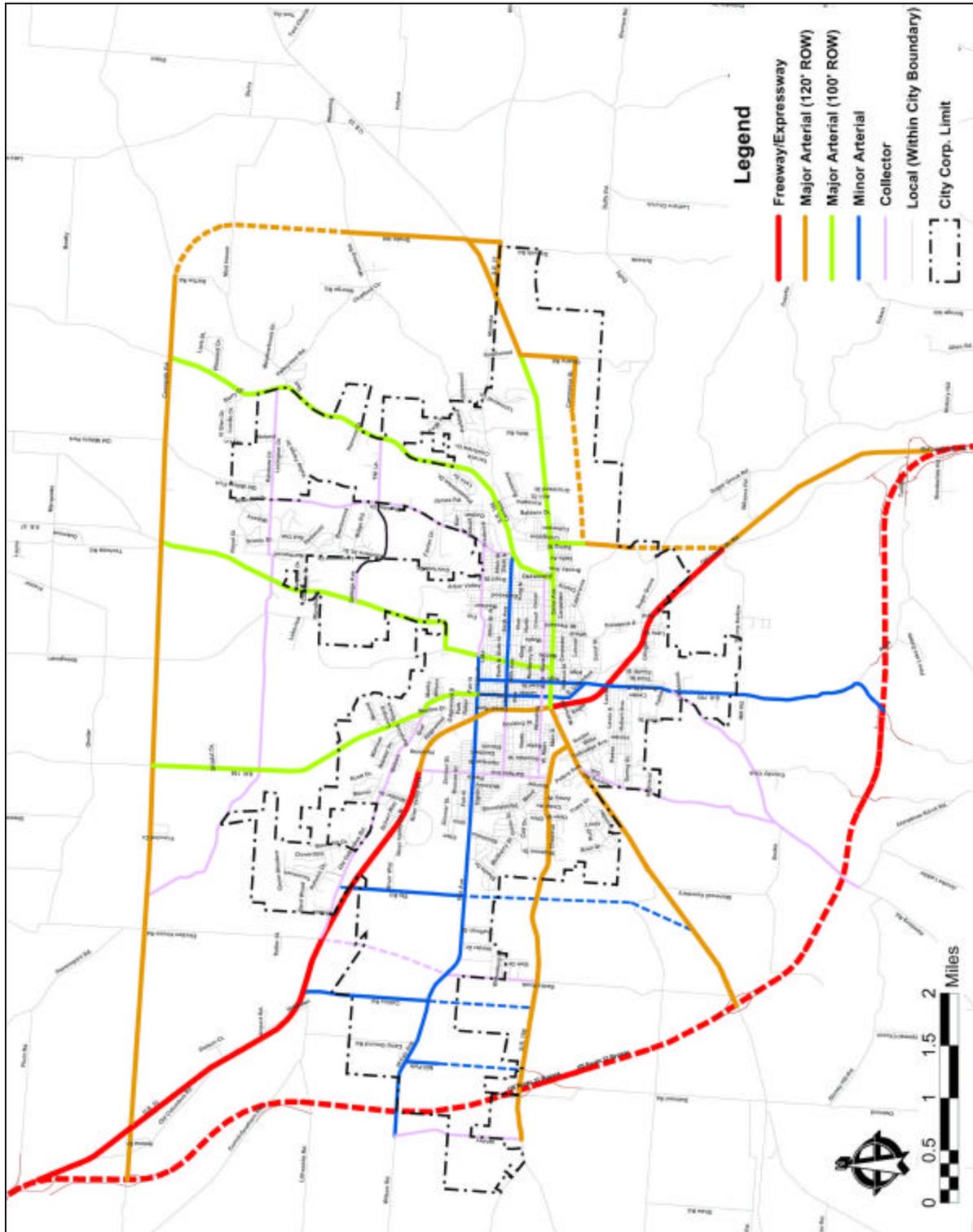
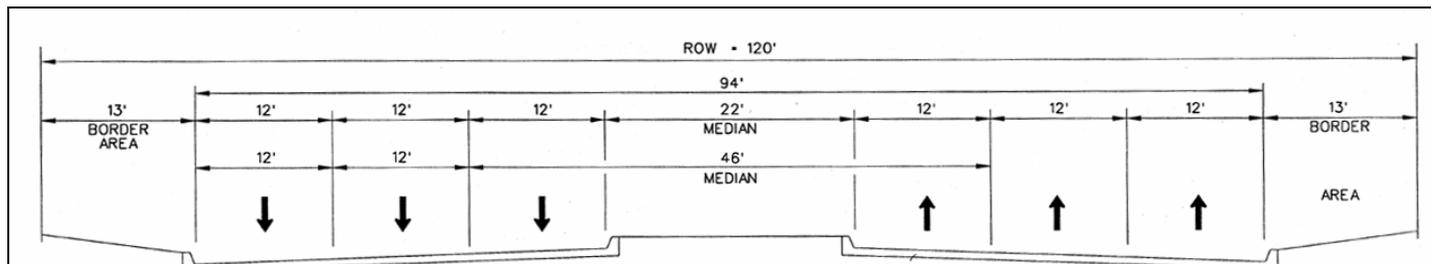
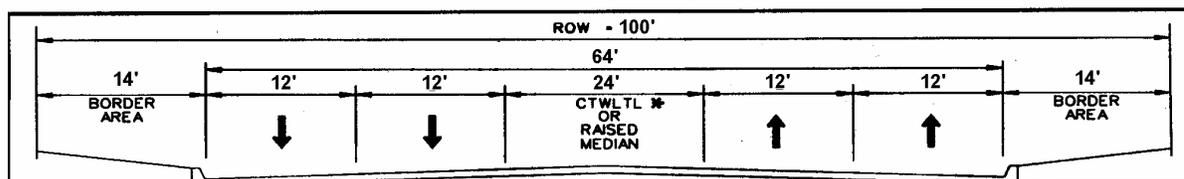


Figure 5-5: Typical Roadway Sections for Major Arterials.



The typical roadway section for a 100 foot ROW includes sufficient width for two 12-foot travel lanes in each direction and a 24-foot median, as shown in Figure 5-6. The median provides sufficient space for a continuous two-way left turn lane (CTWLTL). In addition, a 14-foot border area is preserved on each side of the roadway for curbs, utilities, and sidewalks.

Figure 5-6: Typical Roadway Sections for Major Arterials (100' ROW).

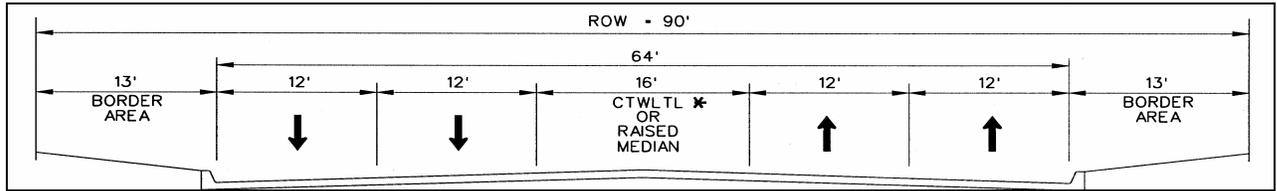


* CTWLTL – Continuous Two Way Left Turn Lane

5.4.2 Cross Section Standards for Minor Arterials

Recommended roadway cross section standards for minor arterials preserve a right-of-way of 90 feet (additional right-of-way required for a non curb and gutter sections), which includes sufficient width for an ultimate cross section of four 12-foot travel lanes and either a 16-foot median or a 16-foot CTWLTL, as shown in Figure 5-7. In addition, a 13-foot border area is preserved on each side of the roadway for utilities, curbs and sidewalks. Initially, in low volume areas, a minor arterial can be developed with only two 12-foot lanes and one CTWLTL and expanded as traffic volumes warrant to the ultimate cross section. For roadways in which future projected traffic volumes exceed 24,000 vehicles per day (vpd), a raised median should be used instead of a CTWLTL to improve safety and preserve the minor arterial's main function of traffic movement and not land access. As the average daily traffic (ADT) surpasses 24,000 vpd, gaps in the opposing traffic stream become shorter and more infrequent. This makes it increasingly difficult for vehicles to execute left turns at mid-block locations along a CTWLTL. A raised median forces all turns to the next intersection, where left-turn phasing can eliminate the conflicts from the opposing traffic.

Figure 5-7: Typical Roadway Section for Minor Arterials.



* CTWLT – Continuous Two Way Left Turn Lane

5.4.3 Cross Section Standards for Collectors

Since collectors generally carry higher traffic volumes than local streets, they require a wider roadway cross section and possibly added lanes at intersections with arterials to provide adequate capacity for both through traffic and turning movements. Recommended roadway cross section standards for collectors preserve a 70-foot right-of-way, with a 44-foot pavement width, as shown in Figures 5-8 through 5-10. This pavement width will provide for three different cross section configurations: two 12-foot travel lanes with on-street parking on each side, two 14-foot travel lanes with a 16 foot continuous two-way left-turn lane in the middle, or four 11-foot travel lanes. The three different cross section configurations should be applied in different areas, with the two lane configuration used in low volume residential areas and the three and four lane configurations used in higher volume locations. The 70-foot right-of-way also includes 13-foot border areas on each side of the roadway.

Figure 5-8: Typical Roadway Sections for Collectors – Alternative 1.

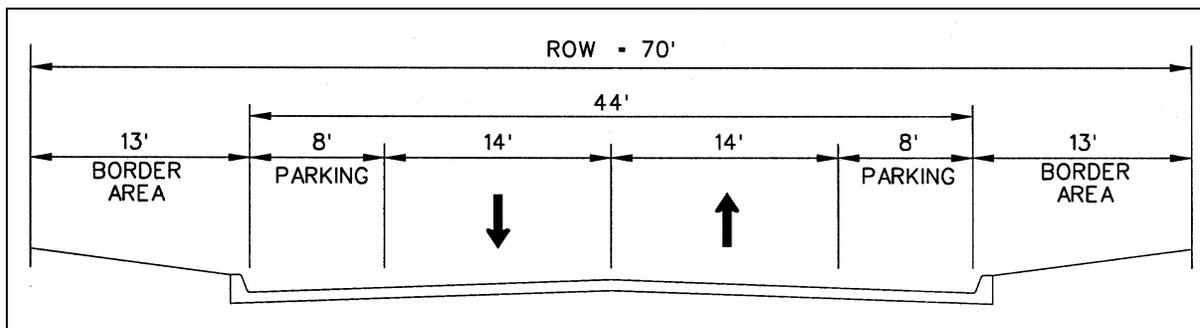


Figure 5-9: Typical Roadway Sections for Collectors – Alternative 2.

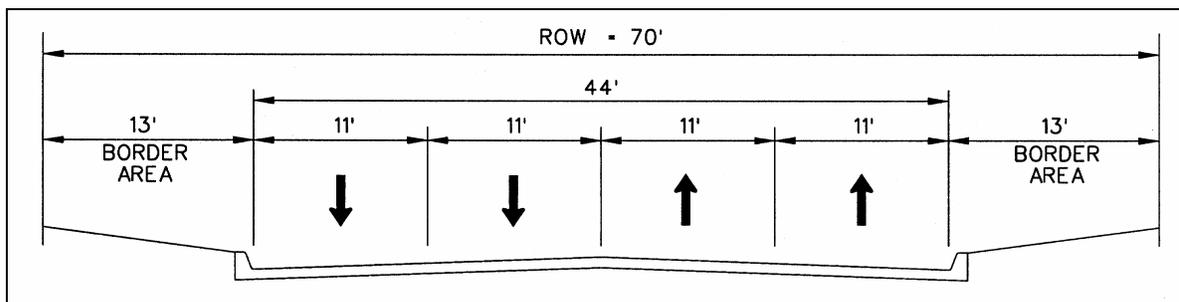
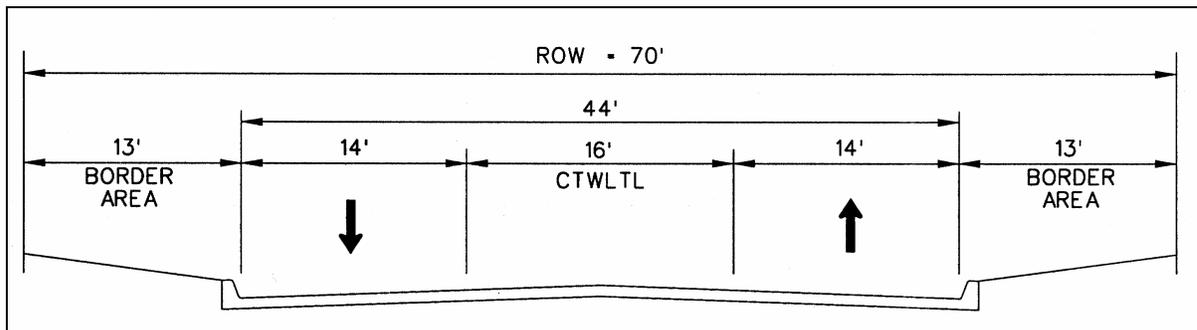


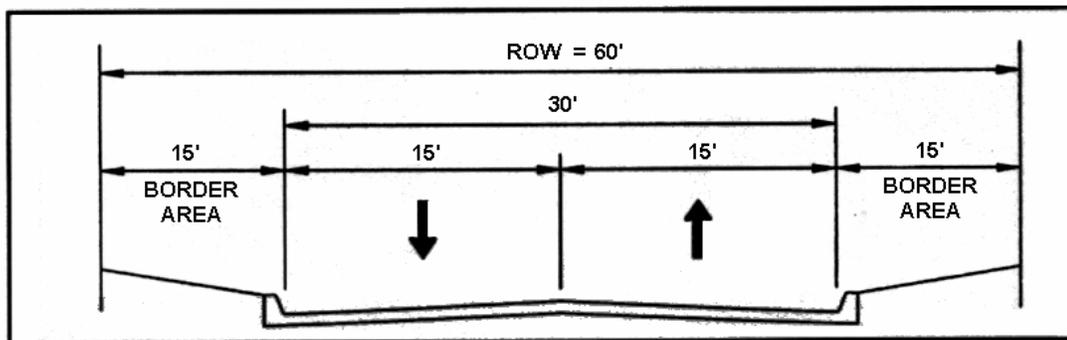
Figure 5-10: Typical Roadway Sections for Collectors – Alternative 3.



5.4.4 Cross Section Standards for Local Streets

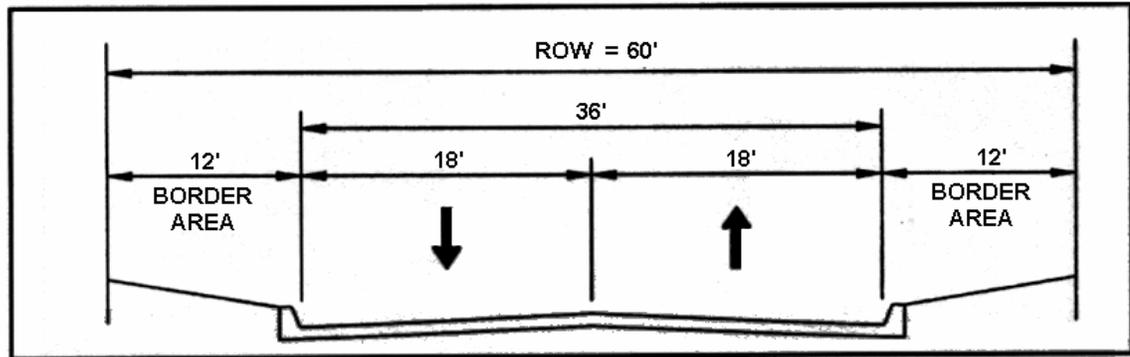
The recommended roadway cross section for local streets preserves a right-of-way of 60 feet, with either a 30-foot or 36-foot pavement width, as shown in Figures 5-11 and 5-12. The 30-foot pavement width will provide sufficient width for 15-foot travel lanes (with eight feet for on-street parking) and a 15-foot border area on each side of the roadway. Through traffic and excessive speeds should be discouraged on local streets by using appropriate geometric designs, traffic control devices, curvilinear alignments, and discontinuous streets. Local streets should be designed for low speed traffic with an emphasis on providing access.

Figure 5-11: Typical Roadway Section for Local Streets.



The 36-foot pavement width is to be applied for those “multi-family” streets that are somewhere between a Local and Collector street in function. The 18-foot lanes will provide flexibility in controlling speeds on such streets. The typical section for the Local (multi-family) street provides for 12-foot border area on either side of the pavement.

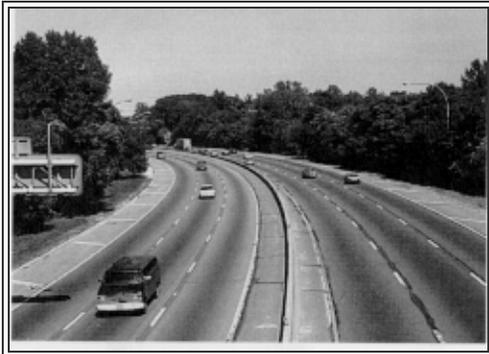
Figure 5-12: Typical Roadway Section for Local (Multi-Family) Streets.



Appendix A

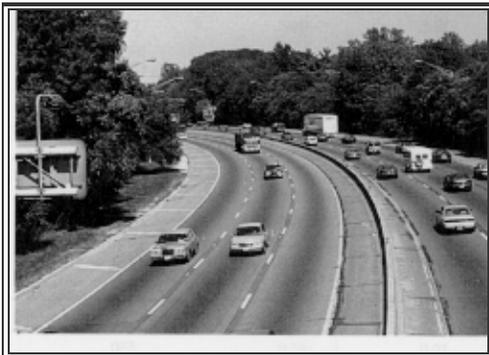
Level of Service (LOS) Description

Level of Service (LOS) measures the restrictive relationship between traffic speed/volume/density and provides an index to the quality of traffic flow in terms of travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Six LOS are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of a year. The figures below are an illustration of LOS for various operating conditions.



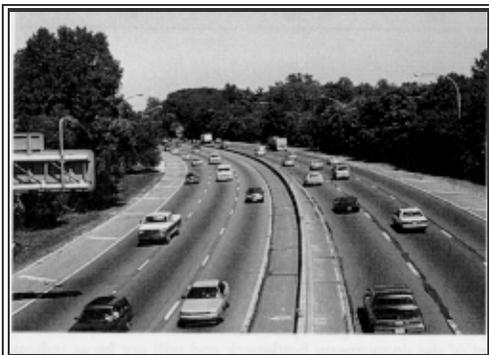
LOS "A"

Optimal vehicle operating conditions. This is a free-flow condition with little or no restrictions on speed or maneuverability caused by other vehicles.



LOS "B"

This designation has a stable vehicle flow, where operating speeds may be restricted by other traffic. However, restrictions on maneuverability are negligible. There is little probability of a major reduction in vehicle speed or flow rate



LOS "C"

This designation still maintains a stable vehicle flow, but at this volume and density most vehicles are restricted in their freedom to select speed, change lanes, or pass. Operating speeds are between 66% and 75% of maximum.



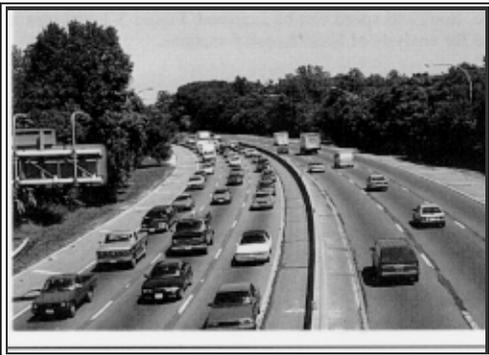
LOS "D"

This designation has unstable vehicle flow. Tolerable operating speeds are maintained, but are subject to considerable and sudden variation. Freedom to maneuver and driver comfort are low.



LOS "E"

This LOS reflects upper capacity limit of the facility. Operations on facilities with this LOS are unstable and speed will fluctuate wildly from point to point. There is little independence in speed selection and maneuverability.



LOS "F"

This is a 'forced-flow' condition. Travel speed and vehicle flow will drop to zero for short-time periods. Vehicle densities will continue to increase as long as the arrival rate exceeds the discharge rate.

Appendix B
Public Survey

PUBLIC SURVEY
Thoroughfare Plan Update
Access Management Policy

City of Lancaster
Lancaster, OH

November 7, 2002



The City of Lancaster has recently selected Wilbur Smith Associates which is a Transportation Planning firm to conduct two studies within Lancaster - a Thoroughfare Plan Update and an Access Management Policy Development. The Thoroughfare Plan Update is intended to develop a traffic management system, identify potential corridor improvements, and identify new links within the study area. The Access Management Policy will provide a strategy for accessing developments along study area routes while also preserving the safety, capacity, and speed along that route.

The City of Lancaster would like your comments and thoughts on these two studies. The project area consists of the entire City of Lancaster as shown in the attached map. Please complete this form so that the City can be fully aware of the concerns you may have. Let us know what transportation issues are most important to the residents and businesses of the City of Lancaster.

NAME	
BUSINESS NAME (If Representing a Business)	
STREET ADDRESS	
CITY	
STATE	
Phone (optional)	

Thank you for taking the time to help the City of Lancaster know what is important to you!
All comments are welcome! We appreciate your participation!

PLEASE RETURN THIS SURVEY BY NOVEMBER 15, 2002 TO

City of Lancaster
Department of Engineering
104 East Main Street
Lancaster, OH 43130

Or contact Wilbur Smith Associates at (614) 888-9440

Thoroughfare Plan Update

1) Which of the following are issues in the City of Lancaster? (check all the applicable boxes)

- | | |
|--|--|
| <input type="checkbox"/> Traffic congestion | <input type="checkbox"/> Narrow or no shoulder |
| <input type="checkbox"/> High speeds | <input type="checkbox"/> Bicycle or pedestrian traffic |
| <input type="checkbox"/> Poor sight distance | <input type="checkbox"/> High growth rates |
| <input type="checkbox"/> Dangerous curves | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Narrow lanes | <input type="checkbox"/> Other _____ |

2) Can you identify areas of significant growth within the City of Lancaster? If so, can you name any transportation problems that exist as a result of that growth? Please be specific in location and description.

3) Are there any roadway locations that you feel are in need of *major* repair in order to maintain safe travel? Please be specific in location and description.

4) In the time that you have been a resident, have you noticed significant changes in traffic patterns? For example: changes in traffic speeds, preferred routes, congestion, rush hour times, etc. Please be specific in location, description, and time frame where changes, if any, have occurred.

5) Please list your major concerns with the existing streets in the project area. If possible, place them in order of importance.

6) Do you believe the construction of the US 33 Bypass will benefit you (please circle your answer)? Yes / No

If YES, How?

7) How often will you use the US 33 Bypass? (Please Check only one box)

- Rarely
- Few Days a Week
- Almost Every Day

8) When you use the US 33 Bypass, which of the following interchanges would you use? (Please Check the most appropriate box, one box only)

- | | |
|---|--|
| <input type="checkbox"/> At Coonpath Rd | <input type="checkbox"/> At Old US 33 South Side |
| <input type="checkbox"/> At SR 188 | <input type="checkbox"/> At Old US 33 North Side |
| <input type="checkbox"/> At US 22 | |

9) Do you believe there is a need for US 22 Bypass (please circle your answer)? Yes / No

Access Management Plan

Are there any other locations within the City of Lancaster that you feel have *major* access problems? Please be specific in location and description.

In the time that you have been a resident, have you noticed significant changes in the number of accidents that occur in Lancaster? If so, have you noticed any of these accidents at or around new land development access points (e.g., shopping center entrances)? Please be specific in location and description, if any, have occurred.

Which of the following are access management issues along US 22? (check all the applicable boxes)

- | | |
|--|--|
| <input type="checkbox"/> Too many access points | <input type="checkbox"/> Inadequate turn lanes |
| <input type="checkbox"/> Too many traffic signals | <input type="checkbox"/> No access control |
| <input type="checkbox"/> High number of accidents at driveways | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Slow speeds along routes | <input type="checkbox"/> Other _____ |

Do you have any specific concerns that you would like to address about access management along US 22? If so, please list the location and description of this concern.

Which of the following are access management issues along US 33? (check all the applicable boxes)

- | | |
|--|--|
| <input type="checkbox"/> Too many access points | <input type="checkbox"/> Inadequate turn lanes |
| <input type="checkbox"/> Too many traffic signals | <input type="checkbox"/> No access control |
| <input type="checkbox"/> High number of crashes at driveways | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Slow speeds along routes | <input type="checkbox"/> Other _____ |

Do you have any specific concerns that you would like to address about access management along US 33? If so, please list the location and description of this concern.

Do you have other concerns related to access management? If so, place them in order of importance.

PUBLIC COMMENTS
Thoroughfare Plan Update
Access Management Guidelines

City of Lancaster
Lancaster, OH

June 16, 2003



The City of Lancaster had selected Wilbur Smith Associates, a Transportation Planning firm, to conduct two studies within Lancaster - Thoroughfare Plan Update and Access Management Guidelines. The Thoroughfare Plan Update intended to develop a traffic management system, identify potential corridor improvements, and identify new links within the study area. The Access Management Guidelines provides a strategy for accessing developments along study area routes while also preserving the safety, capacity, and speed along that route. The City of Lancaster has held an initial Public Meeting on November 7, 2002 at the beginning stages of these studies to gather input from the citizens and general public.

The studies are now at the final stages with findings and recommendations documented in draft reports. This is the final Public Meeting and the City of Lancaster would like your comments. Please complete this form so that the City can be fully aware of your comments.

NAME	
BUSINESS NAME (If Representing a Business)	
STREET ADDRESS	
CITY	
STATE	
Phone (optional)	

Thank you for taking the time to help the City of Lancaster know what is important to you!
All comments are welcome! We appreciate your participation!

PLEASE RETURN THIS SURVEY BY JUNE 30, 2003 TO

City of Lancaster
Department of Engineering
121 East Chestnut Street
Lancaster, OH 43130
(740) 687-6614

Or contact Wilbur Smith Associates at (614) 888-9440

Fold Here

Postage

City of Lancaster
Department of Engineering
121 East Chestnut Street
Lancaster, OH 43130

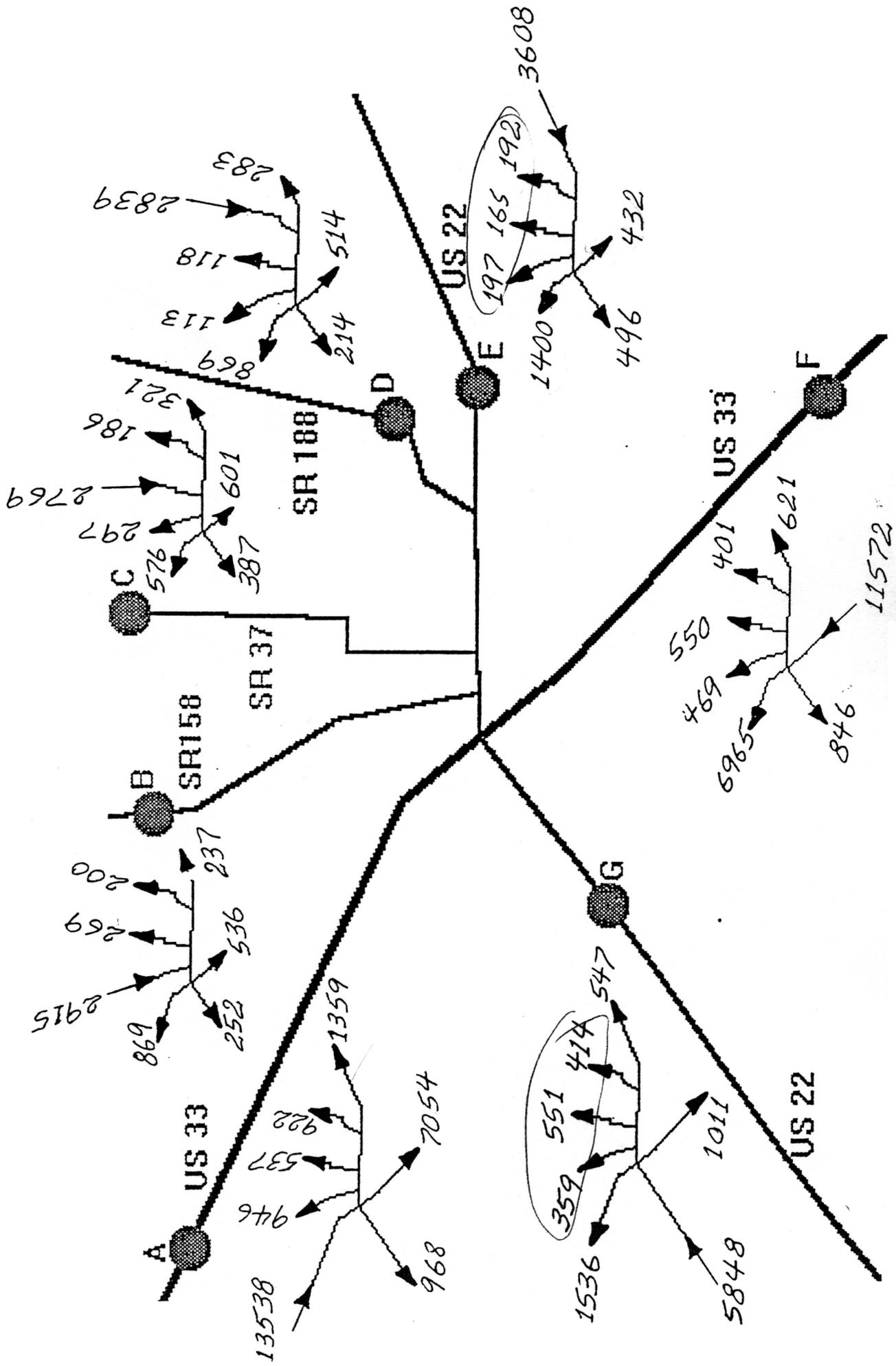
Appendix C
ODOT Draft Report

**LANCASTER ORIGIN-DESTINATION STUDY
AND
BYPASS FEASIBILITY ANALYSIS**

Ohio Department of Transportation
Bureau of Planning

Spring 1994

Figure 2: Graphical Presentation Origin-Destination Matrix Based on Expanded 24-Hour Results

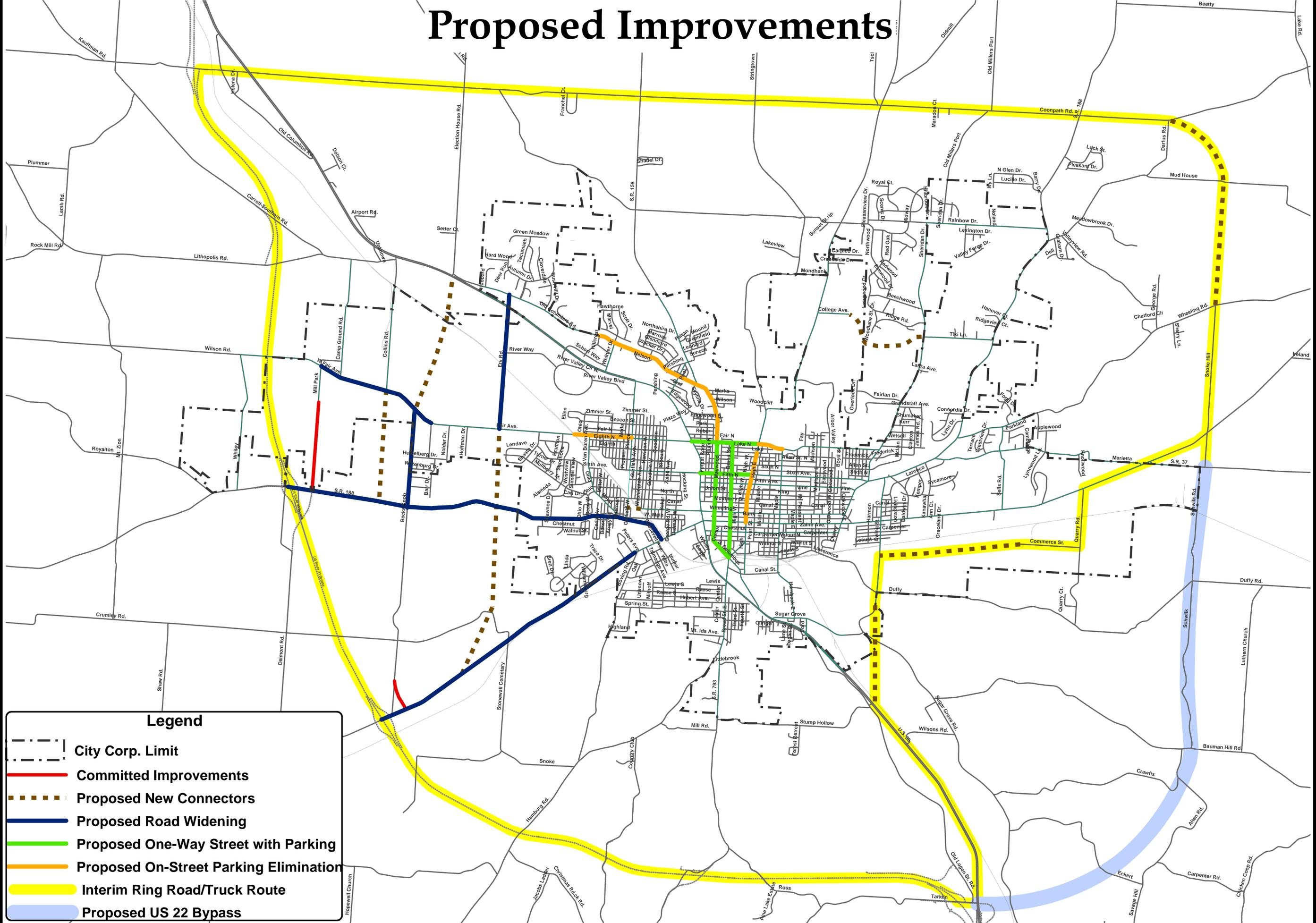


Appendix D

Proposed Improvements

Proposed Functional Classification

Proposed Improvements



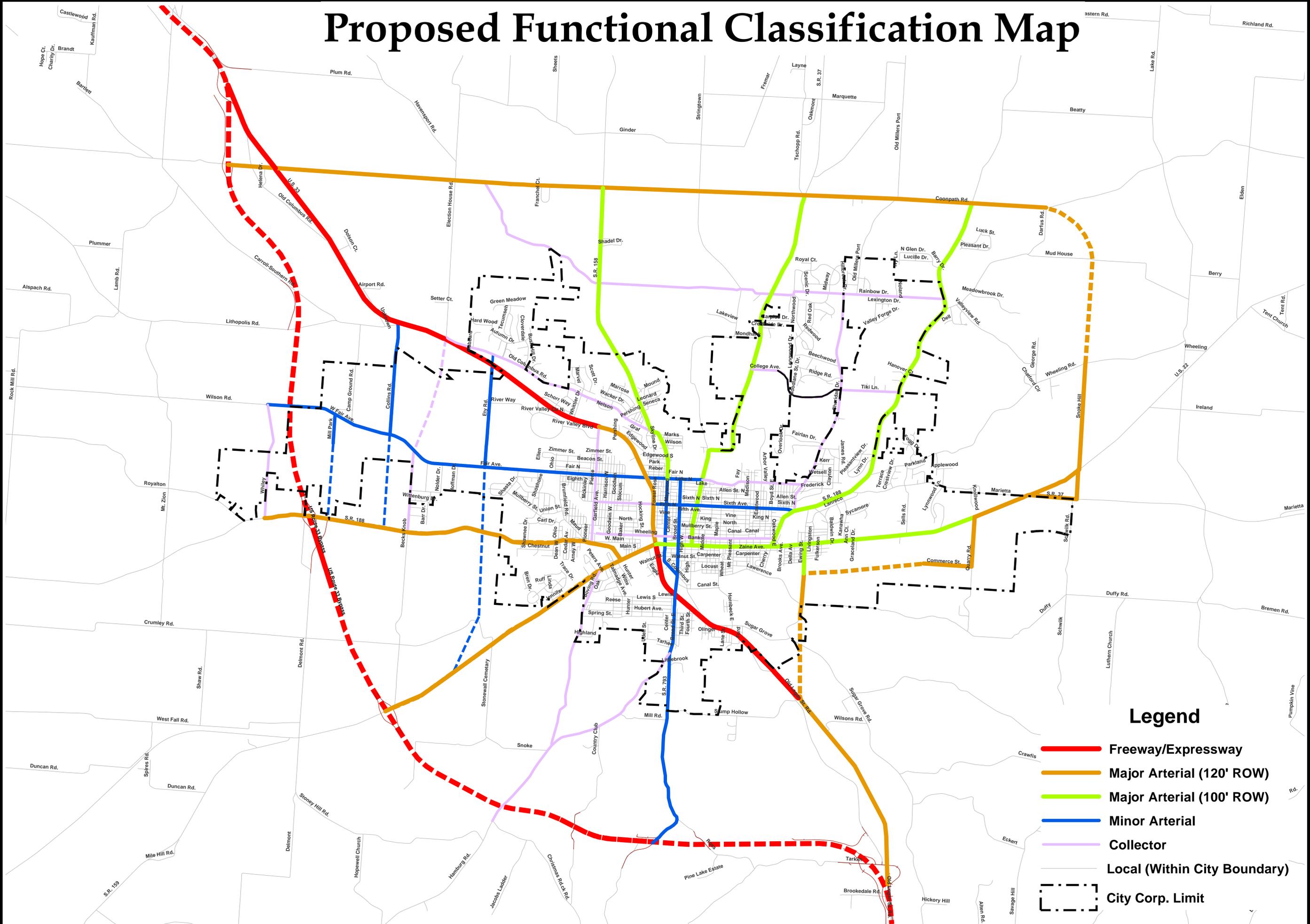
Legend

-  City Corp. Limit
-  Committed Improvements
-  Proposed New Connectors
-  Proposed Road Widening
-  Proposed One-Way Street with Parking
-  Proposed On-Street Parking Elimination
-  Interim Ring Road/Truck Route
-  Proposed US 22 Bypass

City of Lancaster Thoroughfare Plan Update



Proposed Functional Classification Map



Legend

-  Freeway/Expressway
-  Major Arterial (120' ROW)
-  Major Arterial (100' ROW)
-  Minor Arterial
-  Collector
-  Local (Within City Boundary)
-  City Corp. Limit

City of Lancaster Thoroughfare Plan Update

